SEP 20 1940
Medical Library

The Physiotherapy Review

Volume 20 Number 5

Table of Contents

	Page
The Essentials for Success in Therapy—A. C. Ivy, Ph. D., M. D.	259
Internal Fixation of Fractures of Hip by Austin Moore Pins—Nelson W. Cornell, M. D.	261
The Physical Therapy After-Care of the Fractured Hip: Treatment Based on Eight Cases Where the Austin Moore Pins Had Been Employed for Internal Fixation—Margit Aden, G. D., R. P. T. T.	262
Some Salient Facts About the Council on Medical Education and Hospitals—A. R. Bowles, M. D.	268
Mental Measurement of Children Handicapped by Cerebral Palsy—Katharine M. Maurer	271
A Review of the Diseases of the Muscular System: Part II: The Diseases of the Muscular System—Albert T. Steegmann, M. D.	274
Dysarthria and Dyslalia in Crippled Children—Sara Stinchfield-Hawk, Ph. D.	282
The Rationale of the Use of Physical Therapy in Peripheral Vascular Diseases—Roy J. Poplin, M. D.	288
Obstetrical Paralysis—Robert Lee Patterson, Jr., M. D.	291
Training of Physical Therapy Technicians	295
Officers, 1940-1942	297
Editorials	298
Index to Current Literature	299
Abstracts—John S. Coulter, M. D.	302
Book Reviews	313

Published Bi-Monthly By
THE AMERICAN PHYSIOTHERAPY ASSOCIATION
SEPTEMBER - OCTOBER, 1940

The American Physiotherapy Association

Executive Committee

PRESIDENT

CATHERINE WORTHINGHAM.....Dept. of Physical Education for Women, Stanford University, Calif.

VICE-PRESIDENTS

DOROTHY YOUNG.....Route 1, Box 58, Menlo Park, Calif.
BETTY A. RICE.....5160 Claremont, Oakland, Calif.

SECRETARY

EVELYN ANDERSON.....5 Rico Way, San Francisco, Calif.

TREASURER

CATHERINE WALLACE.....823 Monroe St., Santa Clara, Calif.

DIRECTORS

GERTRUDE BEARD.....303 E. Chicago Ave., Chicago, Ill.
CONSTANCE K. GREENE.....53 Burpee Rd., Swampscott, Mass.
MARGUERITE IRVINE.....1011 Summitt Ave., Seattle, Wash.
HELEN L. KAISER.....1800 E. 105th St., Cleveland, O.
SARA KOLLMAN.....500 Harvard St., S. E., Minneapolis, Minn.
ALICE LOU PLASTRIDGE....Warm Springs Foundation, Warm Springs, Ga.

Standing Committees

COMMITTEE ON EDUCATION

DOROTHY FREDERICKSON .....
.....370 Longwood Ave., Boston, Mass.

COMMITTEE ON LEGISLATION

CECELIA A. LEVERONE.....
.....668 Washington St., Brighton, Mass.

COMMITTEE ON MEMBERSHIP

BETTY A. RICE, 5160 Claremont, Oakland, Calif.

COMMITTEE ON PUBLICITY

MRS. HARRIET S. LEE.....
.....1201 Race St., Denver, Colo.

Subcommittee

Exhibits

MRS. MARGARET WINTERS.....
.....950 E. 59th St., Chicago, Ill.

COMMITTEE ON RELATIONS

HAZEL FURSCOTT .....
....219 Fitzhugh Bldg., San Francisco, Calif.

Subcommittees

Advisory Board, American Registry of Physical Therapy Technicians

HELEN L. KAISER.....
.....1800 East 105th St., Cleveland, Ohio

Advisory Board, "The Crippled Child" Magazine

EMMY KYLIN .....
.....409 Prospect Road, Ashtabula, Ohio

Advisory Committee on Services for Crippled Children

MILDRED ELSON .....
.....737 N. Michigan Ave., Chicago, Ill.

National Organization for Public Health Nursing

FLORENCE PHENIX .....
.....1610 Chadbourne, Madison, Wis.

Advisory Committee

FREDERIC C. BOST, M. D.....
.....384 Post St., San Francisco, Calif.

JOHN S. COULTER, M. D.....
.....303 E. Chicago Ave., Chicago, Ill.

PHILIP K. GILMAN, M. D.....
..2000 Van Ness Ave., San Francisco, Calif.

HOWARD C. NAFFZIGER, M. D.....
.....University of California Medical School, San Francisco, Calif.

RAY LYMAN WILBUR, M. D.....
.....Stanford University, Calif.

Membership in The American Physiotherapy Association is $8.00 a year, including a subscription to THE PHYSIOTHERAPY REVIEW. Single copies 35 cents. Subscription for non-members to THE PHYSIOTHERAPY REVIEW $2.50 a year. Single copies 50 cents. Entered as second class matter Mar. 30, 1934, at the post office at Chicago, Ill., under the act of Aug. 24, 1912.

Publication Office: 737 N. Michigan Ave., Chicago, Ill.

The Physiotherapy Review

Published Bi-Monthly by The American Physiotherapy Association

Volume 20 September-October, 1940 Number 5

The Essentials for Success in Therapy

A. C. Ivy, Ph.D., M.D.

It is my pleasure to welcome you into that professional group whose mission in life is to alleviate suffering caused by disease and injury. We belong to a "World Group." There are no national fences in the field of Science, or the Healing Art.

We constantly make war on pain and disease and give no quarter. The work of our day is lightened either by our victories or by our hope of success for tomorrow. We have lost battles in the past which today we know how to win. We know, on the basis of past experience, that the pain and disease we cannot conquer today will be conquered in the future as the scientific background of our technique grows. We have reason to be happy in our work; for, can there be a more noble mission in life than to relieve human suffering, or can more true joy be derived from success in any other pursuit?

In the treatment of suffering caused by disease and injury, the physician uses rest, diet, immunization, chemical and physical agents, and that rather intangible agency known as psychotherapy.

Most of these therapies have been used since the dawn of history. The fact that physical therapy has only recently become a special field of therapy should not imply that its usefulness has been discovered only recently. The fact that a specially trained group, such as yours, is of recent origin only indicates that physical therapy has advanced to such an extent in recent years that a specially trained personnel is required to apply it in practice.

The fundamental principles of all types of therapy are two in number. The first is to help the patient cure himself. We never cure a patient; we only help the patient cure himself. The second is to "splint" by various means a permanently weakened portion of the body.

In order to apply successfully these fundadental principles, we must manifest science, skill and sympathy.

Science

Science means "to know." It means to know that which is true and proven by results that can be confirmed and predicted. Science also includes the search for knowledge, its classification, its generalization into fundamental principles and its application to human welfare. The manifestation of science in physical therapy means that the therapist should know the principle or principles on which a therapeutic procedure is based; whether the principle is theory or established fact; the evidence in support of the therapeutic procedure; what procedure to use under certain conditions and the extent to which it may be employed without harm; when in the course of disease or injury it should be employed; and finally, how to apply the procedure with skill. That is, the therapist should know the why, what, when and how of the various therapeutic procedures. The more we know the better able are we to help the patient cure himself and to splint permanently weakened parts of the body.

We should realize, however, that all useful therapy is not completely scientific. For ex-

Professor of Physiology and Pharmacology, Northwestern University Medical School, 303 E. Chicago Avenue, Chicago, Illinois.

Presented at the Graduating Exercises of the 1940 Class in Physical Therapy at Northwestern University Medical School.

ample, we know that liver therapy will control pernicious anemia. We know that there is an unknown substance in liver that is necessary for the normal development of red blood corpuscles. We know that a normal alimentary tract is required for the production of this unknown substance found in the liver. But we do not know the cause of pernicious anemia, or the nature of the substance in the liver, and why it is necessary for the building of red blood cells. We know that salvarsan is of great value in syphilis, that insulin is of great value in the control of diabetes, yet we are not certain how either of these remedies works in the body.

The same is true of many physical therapy remedies or procedures. We theorize that artificial fever is beneficial because it stimulates the defense mechanisms of the body and can be applied without causing harm. Much evidence supports the theory, but much knowledge regarding the theory is yet to be gained through controlled physiological experimentation. We know that massage, electrical or mechanical, promotes blood and lymph flow, and hence the nutrition of a part. Yet we are not always certain when to and when not to, and how much to massage.

The most easily committed error in therapy is to believe that because the patient improves after therapy that the therapy worked. This is a *post hoc propter hoc* (after this therefore that) error in logic. Our hope or faith, which is the spiritual basis of the Healing Art, tempts us to draw such a conclusion. It is only when therapy is followed by improvement in a large majority of treated patients and a similar degree of improvement does not occur in an untreated control group, or in a differently treated group of patients, that one has reason to conclude that the therapy was of benefit. In pernicious anemia, for example, we know that if the disease is not properly treated, that is, by active liver or stomach preparations, such patients invariably die. And we know that if such a patient is treated with potent liver or stomach preparations, his blood returns to normal and he lives as long as he maintains the treatment, or until he dies of some other disease. Also, when we observe a large group of patients with general paresis, we know that none improve without therapy, and only a few improve with the older therapies. The proper use of hyperpyrexia causes marked improvement in some and partial improvement in more. Of course, hyperpyrexia can do little for those patients in whom brain cells are destroyed, for brain cells do not regenerate and cannot be replaced. It is only when a large control group of patients is studied by objective methods alongside a large treated group that a conclusion can be validly drawn. Wishful thinking is the enemy of Science. New therapeutic procedures must be tried by the method of controlled experimentation.

SKILL

Skill is as important as science in therapy. We all know persons who know a great deal but cannot use, or use skillfully, what they know. Skill means to know and to use or to use knowledge with judgment and dexterity. Skill, of course, depends much on the inherent capabilities of the individual. But the degree of skill an individual is capable of manifesting can be developed only by industrious and persevering effort. In my experience the lack of adequate effort is the cause of the lack of skill more frequently than the lack of inherent capacity.

We all, even the most skillful, become tired, disappointed and discouraged at times. It is then that we are most likely to develop slipshod habits and lose our perspective of our science and skill. Then the quality of courage is our only defense. The person without courage is bound to fail.

SYMPATHY

True sympathy fortified by time is sometimes the best and only potion we can supply the suffering. The administration of therapy is an art as well as a science; it is a profession, not a trade. In its application the heart should be used as much as the head and hands. It is the duty of the physician and his colleagues to "cure" and to be kind and true to his patients. If he cannot "cure," he can at least be kind and true. We can be sympathetic and at the same time scientific. We can smile and also manifest that gentle firmness that so frequently is necessary. It is easy to be cross and impatient when we are tired and indisposed and pressed by an ungrateful and unsympathetic patient. Here again great courage is required to manifest that humor, honor and humanity which are essential for success in the Healing Art.

Internal Fixation of Fractures of Hip by Austin Moore Pins

Nelson W. Cornell, M.D.

In the past, fractures of the hip, occurring in elderly people with a high incidence of nonunion and resulting in a crippled invalid future for many of these unfortunate people, have been a serious problem for the surgeon. One of the most successful methods of treatment recognized in the past was the Whitman abduction method. This method, however, in the hands of surgeons in general gave as high as sixty per cent of nonunion, even after twelve weeks' incarceration in plaster spicas. In recent years methods of internal fixation have been evolved under the leadership of Smith-Petersen for the holding of the fragments in constant apposition and allowing early activity of the patient.

There are two general types of fracture of the hip: the intracapsular and the intertrochanteric. The intracapsular involves the mid-portion of the neck. In this region the blood supply is admittedly poor and the absorption of bone takes place for a distance of an eighth to three-quarters of an inch. These cases put up in plaster for twelve weeks by the nonfixation methods cannot keep the fracture fragments in close apposition by the very nature of their fixation apparatus. Hence adduction, upward riding, nonunion and a crippled existence is in store for a large majority of patients suffering such fractures.

The intertrochanteric type of fracture, which occurs in a much better vascularized area of the bone, treated by nonfixation methods requires at least six to eight weeks of immobilization by plaster or traction, a long enough time to cause marked atrophy of bone and soft tissues with resultant prolongation of convalescence.

Internal fixation should fulfil three important major needs in fractured hip surgery:

1. It should be firm enough to hold the fragments in apposition, that is, abduction during the absorption period, so that when absorption of the neck ceases, union may occur in the proper position.

2. It should eliminate the necessity of prolonged incarceration of the patient in bed, prevent complications of bone and soft tissue atrophy, pneumonia, et cetera.

3. The internal fixing agent should be of such a nature as not to be the cause of aseptic necrosis in the head fragment of the bone.

I feel that the Austin Moore pins supply very adequately these three needs. This method was described by Austin Moore* and consists of inserting three small but strong pins through the shaft and neck into the head fragment.

The Method

The method as we apply it is as follows: An emergency splint is applied to the extremity by the person first seeing the patient. The patient is moved to a hospital where an x-ray is taken with the emergency splint in place. Russell traction is next applied for forty-eight hours after which another x-ray is taken. At this time reduction usually is found to be satisfactory. Two views, that is, anteroposterior and lateral, are absolutely necessary. The hip and thigh are carefully prepared with green soap, lime and soda, washed off with sterile water followed by alcohol and finally by ether, and a sterile dressing is applied.

The following morning the patient is given 80-100 mgm. of avertin depending upon his weight, and he is moved to the operating room. Upon his arrival in the operating room the patient is placed on a Hawley table and Russell traction is reapplied so that there is no doubt about the proper reduction of fragments. Two layers of iodine are applied to a wide area, allowed to dry and then removed with alcohol. A six-inch incision is made beginning at the top of the great trochanter down along the shaft of the femur. The skin is completely walled off from the open wound by means of towels and Michel skin clips.

1045 Park Avenue, New York, N. Y.
Associate Attending Surgeon, New York Hospital, New York.

Read before the New York Chapter of the American Physiotherapy Association, December 20, 1939.

*Moore, Austin: Fracture of the Hip Joint. Surgery, Gynecology & Obstetrics, Vol. 64, No. 2A, Feb. 15, 1937.

The fascia and muscles are divided down to the bone and a point is selected one inch below the base of the great trochanter. A hole is drilled through the cortex of the bone at a forty-five degree angle with the shaft. The first pin is driven in the proper distance, which has been previously measured. An x-ray reveals the position of this pin, after which the other two are inserted above and in such a position as to form a triangle. Another x-ray is taken and if the positions are satisfactory the wound is closed and the patient placed back in bed without plaster or traction apparatus.

The patient is turned in bed the first day and on the seventh day is allowed out of bed. In the next two days he is encouraged to start walking with crutches. Physical therapy is started at this time. Patients are put on a high calcium and high vitamin diet immediately postoperatively and if they are found to have a gastric anacidity, dilute hydrochloric acid is given, 4 cc. tid. with meals.

Check-up x-rays are taken at two week intervals and the patient usually is ready to leave the hospital on an average of from four to five weeks, with fragments in position and, as a result of their activity, with a minimum of bone and soft tissue atrophy.

From this point on, the problem is one of physical therapy with massage, stretching exercises, and so forth, in order that the optimum result may be obtained. This is one of the most important phases of the treatment and on the proper and intelligent handling by the physical therapist depends whether the patient gets just a fair or an excellent functional result.

In a series of fifteen unselected cases, seven of the intertrochanteric and eight of the intracapsular variety, all have united and all have returned to their previous activities. There has been no instance of necrosis of the head fragment. In four cases the nails have been removed; in two cases because of irritation and in the other two cases because the patient has desired it.

CONCLUSIONS

1. Old nonfixation methods in the treatment of fractures of the neck of the femur, especially the intracapsular type, are successful only in a small percentage of cases.
2. Internal fixation should fulfil three major requirements:
   a. Firm and permanent fixation of fragments, so that union may take place after the period of absorption has elapsed.
   b. Permit early mobilization out of bed.
   c. It should not jeopardize the viability of the head fragment.
3. I feel that the Austin Moore nails fulfil these requirements. The method is described and the results given in a series of unselected cases of both types.

The Physical Therapy After-Care of the Fractured Hip

Treatment Based on Eight Cases Where the Austin Moore Pins Had Been Employed for Internal Fixation

Margit Aden, G.D., R.P.T.T.

The physical therapy after-care in the pinned hip fracture is not as difficult a problem as the after-care in the fractured hip, conservatively treated with closed reduction which necessitates prolonged and complete immobilization. The problem presented to the physical therapist is not only one of a lesser degree of damage to the bones and soft tissues in the pinned hip fracture but it is also one of a different kind of damage.

Whereas in the unpinned hip fracture physical therapy must cope with severe contractures of the muscles and with restrictive changes of the joints plus a not inconsiderable gluteal insufficiency, in the pinned hip fracture, on the other hand, the immediate problem confronting us is the muscular spasm around the hip and the lower back.

1045 Park Avenue, New York, N. Y.
Read before the New York Chapter of the American Physiotherapy Association on December 20, 1939, following the paper on "Internal Fixation of Fractures of Hip by Austin Moore Pins" by Nelson W. Cornell, M. D.

Immediately after the internal fixation operation the patient is returned to bed and there is no immobilization with plaster spicas or traction or any particular attempt to surround the whole extremity and the lower back with supporting pillows or sand bags. The patient is placed on his back with a pillow under the knee, and then it is up to the patient himself to devise his own means of protection for his sensitive hip. This the patient invariably will do by immobilization of the hip joint through muscular contractions which are soon translated into spasm.

Upon observing these hip fracture patients in bed on the first day of physical therapy treatment (from the seventh to the tenth day postoperatively) one finds that they almost always have tautness and pain in the hip adductor and hip flexor groups. There is no complaint of pain in the hip joint itself or around the incision, but the patients do complain of the pain in these two muscle groups. This tightness of the hip adductors and flexors is not a true contracture of the muscles but is purely spastic in character. The tenderness and pain in these muscles is caused neither by the original trauma nor by the surgical trauma but is simply a reaction from overwork and exhaustion due to the continued muscle spasm.

Not only do these patients use their hip adductors and flexors, unconsciously, in trying to immobilize their fractured extremity but they also use their lateral trunk flexors, lower spinal extensors and quadratus lumborum. The hip is flexed and adducted, the lower spine is flexed laterally toward the fractured side, producing a lumbar scoliosis on the opposite side and the lumbar spine is hyperextended, resulting in a lordosis. In one case, in addition to the above mentioned defense attitude which is an attempt to keep the extremity safe and close to the body, I observed that the patient had braced the extremity against the mattress as well by defensive contractions of the hamstrings and gastrocnemius.

The protective spasm in the lower back and hip muscles varied to a great extent in the eight cases I have had under my care. Some patients, less apprehensive, seemed automatically to assume a good rest position after the operation with minimum of tension; others, nervous and fearful and perhaps having more pain, apparently had tried to achieve a real "locking" of the hip joint.

We will be unable to give these patients a rapid, painless and complete recovery unless it is understood that the painful and restricted movements are the result of defensive spasm. Defensive spasm will become habit spasm unless it is overcome early in the treatment, and if we allow habit spasm to form and to continue, we soon will have real contractures with which to deal.

The less initial spasm and the earlier disappearance of the spasm, the more speedy is the recovery. These conclusions are based upon cases without such complications as arthritis, nonunion or decalcification of the bones, or where the internal fixation by pinning has been done on old, ununited hip fractures.

Physical therapy for the pinned hip fracture consists of:

1. Massage.
2. Teaching of relaxation.
3. Active exercises and stretchings.
4. Teaching of correct posture and walking.

Massage

The massage should be given to the lower back and to the entire lower extremity. Special care should be taken to soften and distribute the swelling around the incision. The scar should have stretching massage together with friction, which will serve to desensitize it and to free it. The scar rarely develops adhesions, but one always should be ready to prevent them. Massage of and about the scar also will aid in redistributing the fatty tissues and in preventing unsightly indentations at the site of the scar.

Teaching of Relaxation

By far the most important phase of the physical therapy after-care is the control of muscular spasm by teaching of relaxation in (1) rest positions, (2) while attempting active movements, and (3) while passive stretchings to gain mobility are attempted.

The first step in this procedure is to explain to the patient so he thoroughly understands what muscular tension is and the reasons for it.

Next, the patient should be taught to perceive the difference in sensation of contracted and relaxed muscles, and by palpation and by sight he should learn how contracted versus relaxed muscles feel to his fingers and how they appear to his eyes. Then, by alternatingly contracting and relaxing muscle groups at will and by observing the effects, he will,

with practice, be able to control fully his muscles. It should be emphasized that relaxation must be practiced frequently and that he must be on the alert for the appearance of spasm and try to control it consciously.

Defensive attitudes when in bed (the typical picture as described of hip flexion-adduction plus scoliosis-lordosis), when sitting in a wheel chair and when standing on crutches without weight bearing should be analyzed and the patient should be taught how to assume a relaxed and comfortable, yet secure, position for his injured extremity. His apprehension of being jarred suddenly by someone going past his bed should be allayed. It should be made clear to him that a state of constant tension of his muscles does not make his extremity safe from painful outside disturbances. If the extremity is relaxed and comfortable it will follow the outside disturbing movements painlessly, whereas if the extremity is tense in spasm it will resist the outside movements and cause pain.

The pain in the lower back and in the adductor and flexor groups of the hip, which often is severe and necessitates the administration of sedatives, will disappear almost immediately upon relaxation.

There are many approaches which can be used to correct the defensive positions in these fractures. Repeated efforts to relax the individual spastic muscle groups, such as the hip adductors, hip flexors, hip external rotators, the hamstrings, lumbar spinal extensors and lateral spinal flexors, is tedious for the patient. It is advisable, therefore, to make use of mental pictures after the patient knows how to relax these muscle groups. For instance, to think of sinking into the mattress for support of the lower back while the heel "floats" down to the baseboard of the bed and away from the body will alleviate the spastic lordosis and the spastic hip flexion, the pelvis will be levelled and the spasm in the hip adductors will be released automatically. There always is a mechanical strain on the lower back which causes an increased and often painful lordosis when lying flat on the back without considerable flexion of the hip and of the knee. Urging the patient to change positions in bed often helps to relieve tension. Keeping the normal leg in high hip and knee flexion (½ hook-lying) position often releases this strain to a certain degree. Side-lying on the normal side and prone-lying also should be encouraged as often as possible.

ACTIVE EXERCISES AND STRETCHINGS

It is relatively easy to teach the patient relaxation while attempting a greater range of active movements by demonstrating to him that relaxed muscles will allow painless movements, whereas tense muscles will cause pain during the same movements. By the same token he will learn to give and to take the maximum amount of resistance and to allow passive stretchings without permitting the antagonists to go into spasm and restrict the movements.

If the patient has been taught relaxation and is convinced that there is no reason to expect pain and that, therefore, there is no reason for tension, then we must never cause pain without the consent of the patient. If we just once handle the patient's injured leg roughly or try to extend a movement beyond what the patient is expecting and is ready to allow, then we have defeated our own teachings. A single such painful occurrence can lead to the redevelopment of a high degree of fear spasm that might be almost impossible to overcome and thus cause a long delay in the recovery.

There has been a great deal of discussion of mobilization therapy by means of active exercises versus the combination of active and passive exercises. Those who hold the former view are protesting, I believe, against the illogical approach to the contracture problem that permits painful, often injurious, forceable stretchings without regard to the patient's ability to control the stretch-reflex and voluntarily to allow the painful elongation of the muscles. This forceable approach gives very bad results, of course. On the other hand active exercises exclusively, while preferable to forceable, unrelaxed stretchings, also give delayed results and often a permanent, residual joint restriction. For efficiency, better end results, less number of treatments, earlier recovery and less effort for the patient, we must have passive stretchings.

By limbering-up exercises we mean joint mobilization without aid from anyone else. Traditionally such exercises belong to the active exercise group and are being used by the advocates of "active exercises only" in the treatment of contractures. However, the limbering-up exercises very seldom are pure active exercises. They are accomplished by means other than "active contractions with or without resistance." Usually they are a combination of muscle contraction plus a stretching agent and, therefore, rightly

belong to the active-passive movement group. Most limbering-up exercises are so devised that they are a combination of conscious attempt to increase muscle shortening (active contraction) of the antagonists of the muscles in contracture plus passive stretchings with the aid of gravity. The stiff extremity is placed at such an angle that gravity can exert the greatest amount of stretching possible on the shortened soft tissues. Remote and unconnected parts of the body as stretching agents —such as the hands and the arms for pulling and stretching the trunk or a lower extremity or a joint of the opposite upper extremity— are not being considered. Such limbering-up exercises obviously are pure passive stretchings.

The average limbering-up exercises are too strenuous and painful for early fracture mobilization. They require too much muscle power and too much muscle control. It is only in the late phase of fracture therapy when the muscle power approaches the normal and when there is little pain and spasm that these exercises may be used to advantage.

Physiologically every joint permits a few degrees of passive movement beyond what is possible by active contraction. This is true in pathological conditions as well. Clinically I have observed that when a few passive degrees of a movement are lost the active movement suffers a loss to a proportional degree. Also when an increase in the arc of the active movement has been gained, the passive movement always has preceded the active by these "physiological" few degrees. The only exceptions I have encountered are in some cases of bony block in fractures. Here the passive arc is exactly equal to the active. It is possible, though, that in these cases the active arc will be decreased when the joint capsule has had time to take up all unnecessary slack, and that the extra passive movement degrees, therefore, ultimately will appear. When soft tissue shortening is the cause of blocking motion, however, there always seems to exist these proportional degrees of passive motion beyond the active. It seems logical to conclude that there must be a definite reason for the constancy with which these extra passive movement degrees occur. When we realize how relatively feeble muscle contraction is in the innermost part of the action arc and how little resistance is possible there, it seems necessary that the joints must provide themselves with these extra passive degrees of motion in order to insure smoothness and ease for the difficult last part of the active movement. A small amount of resistance at this point would prevent the complete active movement.

Shortened muscles, ligaments and other connective tissues provide a real resistance for any force attempting to elongate them. We cannot expect enfeebled and painful muscles to provide this force effectually. For rapidly clearing away such resistance to active movement we must, instead, furnish the restricted joint with a few extra passive degrees of motion. Passive stretchings must pave the way for rapid gain in active motion.

While it is true that passive movement is a prerequisite for active movement, the passive movement *per se* is of no value. To achieve a large amount of passive motion with the active motion lagging and out of "physiological" proportion can be dangerous. In the lower extremity particularly, loose capsules cause lack of stability, faulty weight bearing and sometimes pain from strain.

All stretching of short tissues is somewhat painful or at least unpleasant. Unless the patient is informed of this, agrees "to take it," and is able to relax consciously when his shortened muscles are being stretched, the stretch-reflex of these muscles will be evoked. The stretching then becomes painful and ineffectual. By making use of the principle of reciprocal nerve innervation one can partly overcome the troublesome stretch-reflex. This principle always should be utilized. The patient should be instructed to aid the stretching movement by actively contracting the opponents of the muscles that are being stretched. For instance, if we are trying to gain knee extension by passively stretching the hamstrings, the patient always should try as hard as possible to extend the knee during the stretching.

All home exercises to keep newly gained passive motion and to increase muscular strength also should make use of this principle. Such exercises should be definite and always include active effort. Relaxed movement or pendulum exercises consisting of rhythmical, swinging movements with gravity removed, which at present are so popular in the treatment of contractures seem to me to defeat their aim. The gravity-free swinging exercises are supposed to increase the passive range of movements by making use of the pendulum force as a passive stretching agent. This is a strong force and a swift one that will quickly evoke the stretch-reflex in painful contractures. Such exercises never accomplish

an increase in joint mobility although they appear to do so. The apparent increase of motion during such swingings is not isolated to the joints concerned but takes place in neighboring joints. To attempt teaching joint isolation in pendulum exercises is hopeless because of the nature of the force employed. The worst sin against active home exercises for painful contractures that the pendulum exercises commit is that they remove the valuable resistance of gravity for the weak muscles that we need and want.

One can expect to regain full joint mobility and normal muscle power in all joints and muscles of the fractured extremity and the lower spine if physical therapy is begun early.

It is by no means to be understood that the reduction of spasm is the whole story in these fractures. Adaptive muscle shortening, tightening of ligamentous bands and shortening of other connective tissues to some degree, and muscle weakness take place although spasm is being controlled consciously and early. Every degree of joint motion gained and the gradual development of muscle power entails much thought and work on the patient's part as well as on the part of the physical therapist. All muscles and joints of the lower back and the entire extremity should be given consideration.

It is well to give some general active exercises. The abdominal muscles, the upper extremities and the uninjured lower extremity should be exercised regularly.

Hip extension. The gluteus maximus is not very important in ordinary walking and does not lose its power readily; therefore, it needs only general training. Passively, however, we must have good hip extension. Some shortening of the hip flexors usually occurs preventing complete extension. When unable to extend the hip completely the patient must use hyperextension in the lower spine as a substitute at the moment the weight bearing is shifted onto the normal extremity in a long step. Such a gait is not only unsightly but causes strain and pain in the back.

Because hip flexion has been favored since the operation (first in defensive spasm and in the assumed slight flexion position because of the pillow under the knee, and later in greater flexion because the patient has had to spend much time in the sitting position), the hip extensors, gluteus maximus and adductor magnus, are slightly weaker than their opponents and full extension, therefore, is sometimes slow in developing.

Hip flexion. Good hip flexion appears early with a little training. However, the last twenty degrees of hip flexion usually are difficult to obtain because of tightening of the capsule and passive stretching usually is necessary. It can be said that when the patient is able to put on his socks and shoes he is ready for discharge from physical therapy.

Hip abduction. Good hip abductors are absolutely necessary for stable, painless weight bearing. These muscles have been at a great disadvantage ever since the operation and are much weaker than their opponents. The hip abductors are the only muscles that need to contract strongly on weight bearing.

To illustrate: when the weight is put on the right leg, the left side of the pelvis would be lowered due to the pull of gravity, unless the right hip abductors contract strongly. The mechanical arrangement can be described as a leverage of the first order with the right hip joint as the fulcrum. The weight of the suprapelvic structures from above as well as the pull of the left leg from below would tend to tip the pelvis sideways, lowering the left side. The amount of strength needed in the right hip abductors to balance this force of gravity is considerable, and any decrease of power in these muscles is a serious handicap.

Hip rotation. The tendency to external rotation contracture must be fought. Active movements as well as stretchings should favor internal rotation over the external.

Knee extension. Passively this movement is nearly complete from the very beginning. The last fifteen degrees of strong active movement, though, is lacking. The quadriceps muscle, as we know, becomes enfeebled upon the slightest inactivity. For all sorts of everyday needs —walking, getting out of a low chair, climbing and descending stairs—we need good power in the quadriceps muscle. Much time, therefore, should be spent in developing complete and powerful knee extension.

Hip adduction, knee flexion, ankle and toe movements are usually strong and little restricted but should be given their share of attention.

The usefulness of physical therapy is impaired unless we can provide almose continuous treatment of twenty-four hours per day. During the patient's hospitalization, therefore, it is necessary to secure the cooperation of the nurses to see that correct positions are maintained and that the patient practices relaxation and active movements as prescribed.

Walking and Posture

The tendency to walk with flexed hip and knee and externally rotated hip and the putting of the weight on the forefoot should be corrected. If the hip is flexed, the knee also must assume proportional flexion on weight bearing. The quadriceps muscle is severely strained if the body weight has to be carried on a bent knee. The patient's chief complaint when first attempting to walk with some weight bearing is not a feeling of pain and weakness in the hip but a feeling of pain and weakness in the knee.

It is the physical therapist's duty to instruct the patient in the correct use of crutches and in good posture and to initiate each progressive step towards recovery as quickly as possible. Balancing exercises should be practiced, such as standing on one leg, on the toes and on the heels, and of picking up objects off the floor. Attempts to walk up and down stairs on crutches should be made early.

It is absolutely essential that the technician should be in close and personal touch with the surgeon for the efficient and safe progress of the patient. Consultation with the surgeon through a third person will not suffice.

Thermotherapy

Thermotherapy in these cases is of no value except for mild and general heat measures as constitute good nursing care; that is, continuous mild heat by means of warm clothing, bulb cradles, hot water bags and warm baths which make the patient more comfortable.

In the pinned hip we have little pain, and what pain there is is caused by defensive spasm. To employ heat or some other temporary sedative for the purpose of overcoming such spasm, even if it were effective, is not the proper method. Conscious control of the spasm on the part of the patient obviously is the logical method of choice. If we use heat for its dulling effect on the sensory nerves we must at the same time and invariably get dulling of the motor nerves as well, which will affect not only the skeletal muscles but also the muscles of the vessel walls. A weakened, minute circulation and weakened skeletal muscles certainly are further enfeebled by strong heat.

The arterial circulation in the pinned hip fracture is adequate for what is demanded of it. The extremity readily receives as much nutrition as it needs and can utilize. The application of heat for this reason, therefore, is not indicated. On the other hand, there is a real need for speeding up of the minute, venous circulation to hasten the absorption of the pathological waste products. However, it is very doubtful, in my opinion, if this can be accomplished by heat.

Heat increases the arterial flow, but I do not believe that heat speeds up the venous and lymphatic circulations to the same and proportional degree. There is considerable lagging of the venous circulation on the application of intense and prolonged heat, particularly when we have increased resistance in the presence of swelling. The great influx of arterial blood without equal drainage soon leads to venous and lymph stasis. A true and harmful slowing down of the venous return takes place in proportion to the rapidity with which the arterial blood fills up the part and increases the pressure on the veins. I have never been able to demonstrate clinically that thermotherapy actually reduces swelling. Unfortunately, I frequently am able to observe that it increases swelling, weakens the venous circulation and creates dysfunction of muscles.

Conclusions

1. Early physical therapy is essential.
2. Pain and initial joint restrictions in the early stage are due to defensive spasm. All means must be used to reduce such spasm, otherwise habit spasm and true and severe contractures will develop.
3. Full and early recovery can be expected if the spasm is controlled, painless passive stretchings are given and continuous active exercises are performed. The most essential movements to regain are abduction, internal rotation and extension of the hip, and extension of the knee.
4. It is believed that thermotherapy as it is generally applied is of no value in these cases.

Some Salient Facts About the Council on Medical Education and Hospitals

A. R. Bowles, M.D.

In my travels over some ten or twelve states in recent months, I have met quite a few physicians and hospital administrators who seemed to know very little about the Council on Medical Education and Hospitals. As a matter of fact, I must confess that I knew very little about it myself before I joined its field staff. I hope I am being logical and not insulting in assuming that probably very few of you know much more than that the Council is connected with the American Medical Association and that, among other things, it has established minimum standards for schools for physical therapy technicians and publishes a list of approved schools. Perhaps, though, upon due reflection you will agree with me that it is rather important that you, as individual members of the American Physiotherapy Association, have at least a general understanding of the Council and its functions. For with such an understanding I believe you will be in a better position to help your national officers to continue to cooperate with the Council. And let me say right here, that I doubt that the Council has ever received as fine cooperation from any group as it has received from your officers. I feel sure that the cordial relationship and mutual confidence which has given rise to that cooperation will continue.

One could write a fair sized book about the Council on Medical Education and Hospitals. However, I shall try merely to outline a few salient facts of special interest.

1. The Council is a standing committee of the American Medical Association. It is appointed by the House of Delegates which, as you may know, is the representative governing body of the Association. The Council is directly responsible to the House of Delegates rather than to a small executive committee or Board of Trustees. Its policies and the minimum standards it formulates for various types of educational programs must be submitted to the House of Delegates for approval. Therefore, those policies and standards cannot be dominated by any individual or any group representing some special interest.

2. The Council is made up of seven members. One member is appointed each year to serve for seven years. This plan of organization makes possible long range planning by men who are thoroughly familiar with the past and present work of the Council. It likewise stabilizes the proceedings of the Council against sudden, capricious variations which might result from the appointment each year of many new members. Furthermore, it would be impossible for persons who have "special axes to grind" to secure a sufficient number of places on the Council to sway its decisions.

3. The members appointed to the Council are selected on the basis of their achievements in the practice of medicine or in medical education. They are not selected on the basis of representing the various specialty fields of medicine, or representing special organizations within the profession. It is true that all of the present members are active in various special societies. But their coincidental membership in those societies merely attests to their leadership in their chosen fields of practice or research. Furthermore, great care is taken to appoint only men with such breath of view that they will not permit the special interests of those societies, or of any other groups, to prejudice their deliberations. On the other hand, their wide acquaintance with many medical groups serves the useful purpose of keeping the Council as a whole well informed on developments in medical practice throughout the country. I might add that due care also is taken to avoid overloading the Council with men practicing the same specialty and, as far as possible, to choose the members from widely scattered parts of the nation. However, both of these factors are secondary in importance to the intellect and character of the appointees.

Council on Medical Education and Hospitals, American Medical Association, 535 North Dearborn St., Chicago, Illinois.

Read before the Annual Convention of the American Physiotherapy Association, New York City, June 17, 1940.

4. The Council has been at work continuously for thirty-six years. During that time quite a few members have served more than one term. This has produced a continuity of well considered action. At the same time a sufficient number of new members have been added to bring fresh stimulus and new talent to the work. That work has been progressive and, we believe, successful in a large measure. But much work remains to be done, and so the effort goes on. May I stress at this point that the Council necessarily deals with minimum standards. Those standards have been revised upward from time to time but only after careful study has indicated them to be reasonable and practical, and after reasonable advance notice has been given to the institutions concerned.

And please note that the Council has always encouraged institutions to exceed the minimum standards. It has not made any effort to force stereotyped plans on schools in order to have each train its students in exactly the same way.

5. The work of the Council is on a purely voluntary basis. It does not exercise any official or unofficial police power. It does not wish to be given such power. It does possess considerable prestige, a prestige which has resulted from the confidence of the profession and of the public in its integrity.

The Council does not directly or indirectly put pressure on any institution to apply for approval. Nor does it put pressure on institutions to meet the minimum standards in their respective fields. But if any institution wishes to be included in the lists of courses approved by the Council, it must voluntarily meet the minimum standards. If it wishes to remain on the list it must voluntarily continue to fulfil the minimum requirements.

Now there is no sense in denying that there is a very real pressure on institutions to qualify for Council approval. But that pressure does not come from the Council. It arises from the fact that persons seeking training in the various fields included in the Council's work and that hospital employing or granting appointments to persons with such training have found the Council's lists the most reliable available guide to quality of training.

There is a real distinction to be noted here. It is not a matter of quibbling over definitions. If the Council's lists did not actually meet a need for a nation-wide guide better than any other existing lists, people would not pay attention to them. And if people did not use the lists, they would have no meaning. Therefore, there would not be any impetus to institutions to seek admission to and to retain a place on the lists.

6. The work of the Council also is voluntary in the sense that no charge is made to institutions for the inspections that must be made. The American Medical Association bears all the expense of the original inspection and of all subsequent examinations. No fee is charged for including the name of an institution in the published lists of approved courses. From this aspect, there is no financial barrier to any institution applying for approval. Nor can any institution that must be inspected repeatedly rightfully claim that reinspections are motivated by financial considerations.

And here is another important point while we are talking about financial matters:—The American Medical Association does not accept donations from any source. Neither the Association nor its Council on Medical Education and Hospitals can be influenced by strings which might be attached to donations.

7. The Council's work is voluntary in the further sense that the Council members are not salaried.

8. The Council can undertake only such functions as are definitely assigned to it by the House of Delegates. For example, before the Council could undertake the survey of schools for physical therapy technicians and the subsequent formulation of minimum standards for such schools, it was necessary to have an authorizing resolution passed by the House. As I understand it, your national officers were instrumental in getting that resolution introduced.

9. In carrying on its work, the Council has invited the cooperation of responsible voluntary organizations which are in a position to give it sound advice or which represent unselfish opinion in allied fields. Of course, the Council has to weigh carefully such advice and opinion and arrive at its own decisions. In other words, it is obviously impossible for the Council to agree in advance to accept in full or in part the advice of any individual or of any group. But I assure you that the suggestions of responsible officers of reputable organizations are given thoughtful consideration. They are not tossed lightly aside.

Now the American Physiotherapy Association has proven itself a responsible organization and has earned national recognition for its high ideals. Your national officers were one of the groups which the Council instructed its secretary to consult at the time the minimum standards for schools for physical therapy technicians were being formulated. The other groups were the Council on Physical Therapy of the American Medical Association and the American Congress of Physical Therapy. All of that took place before my appointment to the Council's field staff so I have no direct knowledge of the proposals of the representatives of the several groups. I have looked through our voluminous files on this matter and the subsequent correspondence. I can readily see that each group may have been disappointed that the Council did not go as far as it advised or, perhaps, went further in formulating the initial standards. Whatever the situation may have been I am confident of this: that the standards were not the result of arbitrary action by the Council. I am confident that the Council drew upon its experience in the field of medical schools and in that of hospital internships and residencies to work out standards which it honestly believed reasonable and practical. It is much better to start out on a level which is too low than to set the level too high. It is better to revise standards upward rather than downward. It is better to work in a restricted area with effort concentrated on a careful study than to dissipate available resources by spreading them too thin over a wide area.

I hope that the American Physiotherapy Association will know that the Council will sincerely welcome its cooperation in the future as it has in the past. It is not possible for the Council to work directly with individual members of the Association, due to our limited staff. We urge that any of you who have practical suggestions or information which you believe reliable in connection with educational work in your field correspond with your local or national officers according to whatever is the custom in the association. Your national officers can then decide upon what material they believe should be passed on to us as likely to be helpful to our common interest in fostering proper training in physical therapy. I assure you that we will be glad to receive such data and that we shall give it careful consideration. It goes without saying that we shall be glad to reciprocate, as we have in the past, by supplying whatever data we have on hand which your officers may need.

* * * * *

Possibly I should restate the functions of the Council since I have only implied them in what I have already said. Very briefly the principal ones are these: to cause the necessary surveys to be made, and to study the factors relevant to proper education in the fields assigned to it by the House of Delegates; from such study to draft minimum standards or statements of the essential factors that are necessary in training courses in order to provide an acceptable quality of training; to cause examinations to be made of institutions applying for approval as providing those essentials and to decide which institutions in fact do provide such essentials; to publish in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION lists of approved courses; and to collect and publish in the same way significant statistical data having a bearing on such courses. Perhaps as a matter of interest only, I should mention a few functions which the Council cannot perform but which are sometimes mistakenly requested of it. Please note that I said "as a matter of interest only" and do not assume that I am insinuating something concerning your association, because I have no such intention. So far as I know, none of the types of request I shall mention have ever come from your association.

(a) The Council cannot undertake to pass on the qualifications of individual applicants for admission to courses, nor for admission to registration examinations. This is the proper function of the official and voluntary registration agencies in the various fields.

(b) The Council cannot act as an employment agency or placement bureau.

(c) It cannot meddle in the internal affairs of hospitals. It cannot grant the requests made by various groups from time to time that recognition be granted only to those hospitals which restrict employment to persons approved by those groups. To cite an example, let us take something which has not happened and which I am sure will not happen. The Council could not grant a request that recognition be withheld from hospitals which employ physical therapy technicians who are not members of the American Physiotherapy Association.

(d) The Council cannot support the economic interests of any group. It cannot permit its decisions to be influenced by the purely economic interests even of physicians.

Mental Measurement of Children Handicapped by Cerebral Palsy

Katharine M. Maurer

Determination of the mental level of children who are handicapped by cerebral palsy presents difficulties which do not arise in the testing of normal children. How these problems can best be met has been a subject of controversy for a number of years. Few mental examiners have been equipped with both a thorough knowledge of this special group of handicapped children and a clear understanding of the assumptions on which present-day mental tests are based.

Intelligence does not yield itself to direct measurement: we must reach our estimation of it through a careful survey of intelligent behavior. To do this we submit each child to be tested to a standardized situation. We ask him certain systematic questions to test his comprehension and reasoning powers. We give him directions to be carried out by motor responses or by verbal manipulation. All of the tasks which are given him to perform have been thoroughly tried out on a large number of children of his own age. A standard to be expected of the average or typical child of that age has been set up. His score is based on the number of tasks which he has successfully performed compared with the standard which has been established.

The first intelligence test to prove successful was made by Alfred Binet in France in 1905 to serve the practical purpose of segregating subnormal from normal children in the public schools of Paris. Earlier efforts to invent measurements which would predict school success and conform to other criteria of intelligence had failed. These investigators had been content with making very precise measures of the more simple mental functions, such as speed of tapping. Binet's scale succeeded in discriminating between the bright and the dull where the others had failed because, instead of demanding a high degree of precision in the measurement of the mental functions being studied, he used rather crude short samples of a great many *different* abilities, borrowing from earlier work and adding many ingenious tests of his own, especially those which aimed to tap the more complex mental processes. Where the score on any one of these items considered separately did not discriminate well enough to be practical, the total score did discriminate when compared with such criteria as teachers' ratings, school achievement and evidence of ability to deal adequately with social situations. Binet, unfortunately, died soon after revising his scale for the third time in 1911. Had he lived to make further revisions, mental tests might be more precise than they are today. Although the tests have been refined, brought up to date in content and greater care has been taken to select the children on which the norms are based, no one has been able, up to the present time, to improve upon Binet's original idea as far as intelligence tests are concerned: what gives to the modern mental test its validity is the inclusion of a great many different items to make up the total score.

During the first years in which all the civilized countries of the world were trying out translations of the Binet Scale, great hopes were raised for the new instrument. It was expected that children of widely differing cultures could be successfully compared by this method. However, it soon became apparent that this could not be done on as wide a scale as had at first been hoped. Children do not grow up in a vacuum. From early infancy they take on the stamp of the particular culture to which they belong. We cannot test intelligence in the abstract—we can only estimate the mental level of the actual child by watching under carefully planned conditions what use he makes of his environment. If cultures vary greatly, no comparison can be made, since equal opportunities are not present. Therefore, efforts to compare racial groups have not proved very convincing. Even within the bounds of our own country we find that children in isolated areas where little schooling is offered cannot be compared with children who live in large cities offering a great

Psychometrist, Institute of Child Welfare, University of Minnesota, Minneapolis, Minn.

Read before the Minnesota Chapter of the American Physiotherapy Association, February 1940.

variety of mental stimuli, and where good schools are available for all. It has been repeatedly demonstrated that children in institutions because of environmental limitations test lower than children of the same general cultural level who live in their own homes. When the institution children are placed in suitable foster homes, they begin to improve in their test ratings and ultimately reach the level to be expected from children of that cultural level who are living in their own homes. Thus we have come to the conclusion that one of the assumptions which limits the appropriate use of, and the interpretations to be made from, intelligence tests is that all children that are to be compared on the basis of them have had *common experience*. In America we mean by *common experience* that the child has been brought up in a private home under reasonably good nutritional conditions, and has, on reaching school age, attended the American public schools. All other children, as well as physically handicapped children, are special cases. The interpretations which are made on the basis of standardized intelligence tests administered to them must allow for the fact that one of the basic assumptions underlying the tests has been violated to an unknown degree.

In the case of children who are handicapped by cerebral palsy, the situation is particularly difficult of solution because of the multiplicity of the handicaps involved. Many of these children, besides suffering motor disabilities of various degrees, possess sensory defects as well, making the administration of tests very difficult indeed. Added to this, there is the very probable accompaniment of a restricted social environment due to the crippled condition. The child may not be able to get about by himself, he may have spent most of life within hospital walls because of necessary surgery, and in many rural districts he lacks schooling altogether because of the problem of transportation and because the local school facilities are unable to meet his particular educational needs. Because of these environmental limitations every child of this group who is capable of any response which may be characterized as intelligent should be given a trial with an educational program before he is given up as uneducable. For those whose defects are not so extreme as to render them untestable, tests should be included in their diagnostic study, but the interpretations of the examiner can string them for him. Thus, this test can be used for any child who can comprehend what the task is and indicate by any slight gesture which of a number of beads is to be used to complete the design.

Special tests which have been devised for the tests should be carefully checked with all other available evidence: the parents' report of social adequacy, the teacher's report of educational progress, the physician's and the physical therapist's reports of the patient's ability to carry out instructions. Perhaps there is no group of children for whom a complete, detailed and carefully collected social history is more important in making a clinical study.

For the majority of cases, and under certain conditions, mental tests can be administered. In the past the problems of testing this group of children have been met in two ways. Standardized tests have been used, the examiner estimating the degree to which common experience has been lacking and interpreting the results accordingly; or a series of special tests selected for the purpose of obtaining a maximum response have been used, for which very frequently no satisfactory standards based on normal children have been available for comparative purposes.

Before coming to any conclusion as to which of these procedures can best serve our purposes in determining the intelligence of this group of children it will be well to state clearly just what these purposes are. First of all, a survey of the intelligence of the group as a whole may be sought (so far, only rather limited samples have been tested). Secondly, and perhaps more important at the present time, we want to use the tests to make plans for individual children. We want them to help us answer such questions as the following: Just how much will this child profit by muscle reeducation? Is it worth spending the time, the money and causing the child the discomfort of surgery? Would he profit enough by schooling for it to be worth the effort to send him to school? To what kind of an educational program should he be exposed? What are the chances that vocational plans will be feasible for him? Will this child ever be able, with the proper training, to take his place in the world as a self-supporting, or even a partially self-supporting individual? In short, except for the physical training which must be adapted to this particular group of handicaps, what we want to know about this child is what we want to know about every child—normal as well as handicapped—what chance has this child to

compete successfully in a world made up of normally functioning people?

Since our purposes in attempting to ascertain the mental level of this group of children are essentially the same as they are for all children, it appears reasonable that the standardized tests are the best tests to use. Some rather sentimentally inclined persons will protest that the usual tests are "unfair" to the handicapped child. They show up his disabilities rather clearly, it is true. And this is precisely what we wish to find out from them. We want to know how many of the things that normal children of his age do, he can do. Only by facing in an unemotional manner the demonstration of his abilities and disabilities, keeping always in mind that he must be provided with the opportunity to develop the abilities, can we be of any service to him.

The examiner who is to handle these special cases needs not only to be thoroughly familiar with her instruments, but she also needs to know something of the peculiarities of children with cerebral palsy. She must realize fully how easily they fatigue and meet this problem by breaking up the testing periods into rather short units. She must use all the techniques possible to put the child at his ease and reduce tension to the minimum. She must train herself to listen calmly and without impatience to his halting speech. She must in every way through her manner encourage him to make the best effort of which he is capable. A preliminary interview with the child's mother is very valuable in estimating the kind of home training the child has had; whether he has been badly spoiled and has not developed any habits of persistence, or whether he has been trained to make the most of what he has and to fit in with normal people as cheerfully as possible. Not even the best of examiners can overcome, in an hour or two, the effects of years of bad home training, whether the child is normal or handicapped. And finally, she must have enough courage to say that she has not been able to come to any conclusions regarding the child's mental level if, after using every resource at her command, this is indeed the case.

During recent years mental tests, still based on the original Binet in general conception, have been improved in the details. More items have been invented, greater care has been taken in placing them in a scale of difficulty with the aid of new statistical procedures, and larger groups than ever before and more carefully selected groups have been used in setting up norms. Speed, always a difficulty even with young normal children, has been largely eliminated from tests of a verbal nature. Such time limits as are still included have as their purpose signaling the examiner that, under normal circumstances, the child's probability of being able to succeed with that particular task after a given length of time is very small indeed and she may safely proceed to the next test. With a few exceptions, time limits may be ignored completely without invalidating the tests. Provisions have been made to adjust the score so as not to penalize the child for whom a few items must be omitted. The competent examiner, who knows the purpose of each item in the test used, often can make slight modifications of procedure without interfering with the value of the test. For example, if the task is to reproduce from memory a design of beads, the child who cannot use his hands well enough to string beads can indicate which ones he wants used, and diagnostic purposes with children with cerebral palsy but which do not discriminate between normal children are doubtless of value to the teacher of handicapped children. Anything which increases her knowledge of the individual child's possibilities of performance will better enable her to cope advantageously with him. But until special schools and institutions have been set up to care for these children where they will compete only with their own kind, the standardized test will best serve us in making plans for them. Even when special tests have been perfected beyond their present limitations, it is doubtful whether they will answer as many of the questions we want to answer as the more universally used tests. Only by making comparisons with the normal child who sets the standards in the world at large can we predict what chance the handicapped child has to adjust satisfactorily outside of an institution which has been carefully planned to meet his needs.

A Review of the Diseases of the Muscular System

Part II. The Diseases of the Muscular System

Albert T. Steegmann, M.D.

Attempts to classify these diseases on a morphologic basis have been unsatisfactory. Clinical classifications such as the one proposed by Aring and Cobb on the basis of the sporadic or familial incidences of the disease also is not entirely satisfactory because the difficulty in determining genetic factors in many cases leads to what apparently are exceptions to the rule. Another difficulty met with is the tendency to call so many of these diseases by the names of men credited with their original description, a tendency which may in some conditions disregard the relationship of one to the other. This frequently leads to loose thinking with the substitution of rote memory for principles in the understanding of disease. The classification presented here attempts to keep the natural history of the disease in the foreground. The acuteness or chronicity of a process always is serviceable in giving a lead to the proper diagnosis. At the same time a classification must be plastic enough to permit modification with advances in knowledge.

The muscular disorders depend on the unity of the final common pathway. Therefore, the simplest classification would be simply to divide those diseases of neurogenic (or more accurately, neuronogenic) origin from those which arise from some condition or disease in the muscle itself. This would immediately eliminate all diseases or conditions produced by lesion in the central nervous system except those which involve the anterior horn cells directly. Muscular atrophy resulting from disuse, cachexia or nutritional disturbances do not properly belong in the classification, although it may be true that in time biochemical or metabolic factors common to both may point to a related pathogenesis. Until that time comes such conditions will have to be considered only in the sense of making a differential diagnosis. Of the non-neurogenic disorders it is better to exclude conditions of extrinsic origin, such as fibrositis, atrophy resulting from disuse, or atrophy resulting from disease in a neighboring joint or tendon. It is doubtful if myasthenia gravis, family periodic paralysis and myotonia congenita should be classified with the muscle disorders unless they are placed in a separate group (see below.) Furthermore, the separation of muscle disorders with pseudohypertrophy from those without pseudohypertrophy is a purely artificial division because pseudohypertrophy may occur at a certain stage of the disease in muscles that later become atrophic. Such a division is justifiable because in some cases pseudohypertrophy never occurs during the entire course of the disease.

10515 Carnegie Ave., Cleveland, Ohio.
Senior Clinical Instructor in Neurology and Neuropathology, Western Reserve University School of Medicine, Cleveland, Ohio.

Classification

Diseases of the Muscular System

I. Neuronogenic
- A. Spinal (Anterior Horn Cell)
  - a. *Acute*
    1. Anterior poliomyelitis
    2. Acute ascending paralysis (Landry)
  - b. *Chronic*
    1. Progressive spinal muscular atrophy
       - (a) Spinal Form
       - (b) Bulbar Form
       - (c) Mixed Form
    2. Poliomyelopathia chronica
    3. Amyotrophic lateral sclerosis
- B. Neural (Peripheral Nerve)
  - a. *Acute* (in terms of onset)
    1. Acute infectious polyneuritis (neuronitis)
    2. Traumatic neuropathy
    3. Acute facial palsy (Bell's Palsy)
    4. Toxic polyneuritis of rapid onset
  - b. *Chronic*
    1. Hypertrophic interstitial neuritis (Dejerine—Sottas)

2. Peroneal—forearm type (Charcot—Marie—Tooth)
3. Toxic neuropathy of gradual onset
4. Nutritional neuropathy (avitaminosis)
5. Pressure neuropathy of gradual onset

II. Myogenic
- A. Progressive muscular dystrophy
  - a. Without pseudohypertrophy
  - b. With pseudohypertrophy
- B. Other myopathies
  - a. With myatonic reaction
    1. Myasthenia gravis
    2. Family periodic paralysis
    3. Amyotonia congenita (Oppenheim)
  - b. With myotonic reaction
    1. Myotonia congenita (Thomsen)
    2. Dystrophia myotonica (Hauptmann)
    3. Paramyotonia congenita (Eulenberg)

Pathology. The pathology of the neuromuscular disorders will be presented in a clinical resume of the most important disease of the above classification.

Poliomyelitis. This disease is produced by a filterable virus transmissable to monkeys. The epidemic tendency of the disease, its seasonal incidence in the late Summer and early Fall, and the greater susceptibility of children between the ages of two and four years of age requires no special discussion. The disease has a predilection to attack the gray matter of the spinal cord, especially the anterior horns. It produces degeneration of the anterior horn cells and the motor nerve roots. This results in atrophy and varying degrees of paralysis of the skeletal muscles depending upon the degree of injury and the number of anterior horn cells involved. The brain is not severely affected in most cases but occasionally certain nuclei of the gray matter (motor nuclei) of the brain stem are involved, giving rise to associated bulbar or cranial nerve palsies. In the spinal cord the anterior horn cells are degenerated very early in the disease and the anterior horns show an intense proliferation of inflammatory cells (leucocytes), glial cells and collars of lymphocytes around the blood vessels. The degree of ganglion cell destruction varies greatly in different spinal segments as well as in different cell groups of the same segment. A given segment may show a complete loss of ganglion cells entirely replaced by glia cells. Degenerated ganglion cells may be seen lying side by side to ganglion cells that appear perfectly normal. Both reversible and irreversible types of ganglion cell degeneration occur.

In most cases the destructive advance of the disease is completed in a few days, leaving the victim weak or paralyzed in one or many muscle groups. This is followed by the long, slow stage of recovery, which varies tremendously in individual cases. In the later stages of the disease the injured nerve cells degenerate or recover, the inflammatory reaction subsides, the active glial cells (microglia and oligodendroglia) regress and the tissue becomes the site of scarring from the activity of the fiber building glial cells (astrocytes) of the nervous system. This produces shrinkage of the anterior horns. The peripheral motor nerve fibers degenerate or regenerate accordingly. The changes in the peripheral nerves and muscles are the same as in peripheral nerve diseases and will be described later.

Since a given skeletal muscle receives its innervation from several spinal segments, the variation in the pathologic process permits all manners and degrees of paralysis of the muscles. Part of the paralysis in the acute stage is produced by a physiological disturbance dependent upon inflammation, swelling, disturbed circulation and other temporary changes which accompany the pathologic process. It is safe to predict if a paralyzed muscle can be voluntarily contracted by the patient within five days after the termination of the paralytic stage of the disease, complete recovery will occur. Reeducation and continued treatment may result in further recovery to a remarkable degree. The loss of muscle tone, reduced or absent tendon reflexes, motor weakness and the long period needed for recovery all depend upon the principles described in the analysis of the final common pathway and upon the degree of pathologic changes in the tissues.

Acute Ascending Paralysis. The case of ascending paralysis described by Landry in 1859 was characterized by an ascending motor paralysis accompanied by paresthesias and a band-like constriction sensation around the body at the upper limit of the process. There was no fever, pain, sphincter disturbance or fibrillary muscular contractions. The tendon reflexes were absent but the muscles responded to faradic stimulation. Death occurred in eight days. Brown recently suggested that

the disease was the result of beri-beri. Some of the cases of this type are atypical cases of poliomyelitis. Others seem to be a pure motor disease of some type, but not poliomyelitis or acute myelitis. There is little proof that some of the cases are due to a dietary, nutritional or vitamin deficiency. It seems that an infectious agent can produce this clinical picture but the etiologic factor has yet to be discovered. Sixty to eighty per cent of the victims die and no known treatment can stop the advancement of the paralysis.

Progressive Spinal Muscular Atrophy. This is a chronic degenerative disease of the spinal cord of unknown cause. It has a tendency to be of hereditary or familial incidence. The course may be rapid, from eight to twelve months, or protracted over a period of years, but invariably it is fatal. With the exception of the type described as the infantile form by Werdnig and Hoffmann, the disease occurs in adults after the age of thirty or in midlife and is more common in males than in females. A number of clinical forms have been described but they are all dependent upon the same type of pathologic process—namely, a slow degeneration of the anterior horn cells. The region in the spinal cord or brain stem which undergoes degeneration first has led to the differentiation of a number of clinical forms. Thus we speak of the ophthalmoplegic form, when the extrinsic muscles of the eye are first involved, or the bulbar form, which first causes atrophy of the muscles of the lips, tongue and pharynx. The type described by Duchenne and Aran produces atrophy first in the intrinsic muscles of the hands. In the spinal form, the muscular weakness and atrophy frequently begin in the muscles of the shoulder or pelvic girdles. In all of the various forms the disease gradually spreads to new muscle groups if the patient lives long enough. The bulbar nuclei almost always become involved sooner or later in the spinal muscular atrophies with subsequent difficulty in swallowing. Death usually results from respiratory failure or from bronchopneumonia following the aspiration of material from the pharynx. The infantile form of Werdnig-Hoffmann begins in early childhood, usually by the age of six months. The muscles of the thighs and pelvic girdles are first affected with a tendency of the atrophy to spread upward to the shoulder girdle and finally to the extremities. Fibrillary twitching or a peculiar clonic-like jerking of the muscles may occur. Some investigators believe that this disease is related to amyotonia congenita described by Oppenheim except that the latter disease begins in fetal life whereas the former begins after birth.

The anterior horn cells in these diseases become shrunken and show an accumulation of lipoid pigment in the cell. Later the cells undergo complete degeneration and are replaced by fiber-forming astrocytes with scarring and shrinkage of the anterior horns. The motor nerve roots and muscles undergo secondary degeneration. The white matter of the spinal cord may become degenerated in the later stages of the disease. Atrophy of the muscles begins early and may progress to a considerable degree before the patient notices it or is aware of much muscular weakness. As a rule they progress together and the patient may complain of a dull aching pain in the shoulder. This probably is due to ligament strain because the atrophic muscles lose tone which aids in the support of the joints. The tendon reflexes become sluggish and gradually disappear. An important diagnostic sign is the twitching of the affected muscles. This may be recognized as fine fibrillations of a small group of fibers in the muscle bundle (fibrillary twitching) or of larger groups of bundles of fibers (fascicular twitching). These changes are not associated with any sensory changes of significance. The muscles in the early stage may show a myototic irritability to the electrical tests. The reaction of degeneration occurs later and is of great diagnostic significance. When bulbar palsy occurs the patient develops difficulty in swallowing, at first for solid food and later for liquids which are regurgitated through the nose. The voice begins to show a nasal quality, eventually making speech difficult or impossible to understand. The mouth becomes flattened and the weak muscles of the upper lip produce a peculiar expression when the patient tries to show the teeth.

Poliomyelopathia Chronica. Chronic poliomyelitis, or more properly, poliomyelopathy, is a form of progressive spinal muscular atrophy that occurs in individuals who have had an attack of acute poliomyelitis earlier in life. This disease is quite rare and not easily differentiated from the ordinary form of progressive spinal muscular atrophy. In some cases weakness occurs long before atrophy, fibrillary twitching may not be present and there may be degeneration of the white matter of the spinal cord (see bibliography).

Amyotrophic Lateral Sclerosis. Amyotrophic lateral sclerosis is a disease that is be-

lieved by some to be a form of progressive spinal muscular atrophy. I believe they are not the same disease and the reasons for this opinion will be presented below. Both diseases are probably what has been called a "system degeneration," that is, the motor nerve cells undergo degeneration from some cause which cannot be determined by the present histological methods of investigation. In amyotrophic lateral sclerosis there is degeneration of the pyramidal tracts and the motor cells of the cerebral cortex. This causes a bilateral spastic type of paralysis. The same process occurring in the anterior horn cells of the cervical portion of the spinal cord results in degeneration of the motor nerve roots and muscles similar to that described in progressive spinal muscular atrophy. In a typical case, atrophy begins in the intrinsic muscles of the hands and there is an associated bilateral spastic paralysis of the lower extremities. The atrophy in the hands spreads upward to the shoulder girdles and chest, and bulbar palsy finally occurs. The tendon reflexes in the arms are at first brisk but become diminished as the atrophy progresses to the arms and shoulder girdles. The lower extremities usually remain spastic with exaggerated reflexes and other signs of pyramidal tract disease. The degeneration of the white matter in the lateral columns of the cord in this disease occurs early. In progressive spinal muscular atrophy it occurs late, usually after the stage of bulbar palsy with its associated difficulty in eating. It seems reasonable to assume in this event that the degeneration of the white matter of the cord may be the result of vitamin deficiency and metabolic changes associated with starvation and the poor nutritional state that follows. The similarity of the two diseases in the late stage therefore may be more apparent than real.

The Neural Type of Diseases of the Muscular System. If the peripheral nerve is diseased or injured, the anterior horn cells and the muscles undergo secondary degeneration. A great deal has been learned about this process because the peripheral nerves can be sectioned and the results studied in experimental animals. Such changes in the nerve fiber were first studied by Waller about 1850. Since that time the process has been spoken of as Wallerian degeneration. If a peripheral nerve is cut, the nerve will degenerate below the level of the lesion. Certain changes also will take place in the nerve cells in the spinal cord and in the proximal stump. If the ends of the severed nerve are not approximated, regeneration will not occur, but if the ends are sutured together, regeneration to a greater or less extent will follow. This process may take many months. The anterior horn cell shows a breaking up of the Nissl granules (chromatolysis). This begins within forty-eight hours and reaches its heighth in fifteen to twenty days. The chromatolysis begins in the center of the cell, the cell swells to a rounded contour, probably as the result of the imbibition of fluid, and the nucleus enlarges and becomes displaced to the edge of the cell. Occasionally it may even be extruded from the cell. During the same time the Nissl granules are reduced to dust-like particles or may disappear entirely and the cell cytoplasm appears as a homogeneous mass. The neurofibrils disappear at first in the central part of the cell. The cell degenerates entirely if the nucleus is extruded, otherwise these changes may be reversible and restitution occur. The degree of these changes depends upon the degree of injury to the nerve fiber and the distance of the injury from the anterior horn cell. Other types of degeneration of the anterior horn cells such as shrinkage may take place from peripheral nerve injury. The ganglion cells showing chromatolysis and the changes described above may begin to repair within twenty days and be completed after eighty days. Repair is said to occur in some cells even if their axons do not regenerate. The peripheral part of the nerve fiber begins to degenerate within twenty-four hours and after three days it is incapable of conducting the nerve impulse. The earliest changes take place in the myelin sheath. The myelin breaks up into masses or globules of varying size and the lecithine breaks down to fatty acids which can reduce osmic acid. Later they show a staining for fat stains and still later the myeline sheath is completely destroyed. While these changes are taking place, the axis cylinder breaks up into short fragments or into granules which mix with the fatty droplets of myelin. The neurolemma thickens, the nuclei enlarge, proliferate and lie in a cytoplasmic mass. The myelin is phagocytized and carried away by cells probably derived from the neurolemma. The nerve fiber then begins to regenerate. It is usually taught that the axis cylinders grow down into the peripheral portion of the nerve from the proximal stump which is transformed into a nucleated cytoplasmic mass. Some fibrils loop on themselves, branch out or are lost, but some find a course along the distal end of the nerve

and grow into it. Later the myelin sheath reforms and the neurolemma and nodes of Ranvier are regenerated. If the nerve ends are not approximated, the proximal stump may form a bulb containing many axons. This forms a tumor called a neuroma. Those bulbs may be very painful and sensitive to pressure. In the central nervous system, regeneration in the fashion described does not occur. After the nerve is sectioned, the chronaxie of the nerve and muscle is not changed for a short time, but after the nerve ceases to function the muscle chronaxie (within two weeks) may increase more than thirty times. The importance of this will be considered at more length under electrodiagnosis and therapy.

When the nerve fiber is injured by pressure, infection, toxic agents or other processes that produce a neuritis or a neuropathy, changes in the nerve fiber somewhat similar to those occurring in Wallerian degeneration occur, depending upon the degree, intensity and duration of the injury. This is true in neuritis associated with chronic alcoholism or dietary deficiency. In some types of neuritis such as that occurring in diphtheria the interstitial tissues (connective tissue) of the nerve show both proliferative and inflammatory changes.

In the early stages of a peripheral neuritis, the spinal nerves which contain both sensory and motor fibers go through an irritable stage characterized by muscle twitching and irritability and at the same time the patient experiences sensory symptoms such as prickling, tingling or burning in the affected regions. Later motor weakness or paralysis occurs and the sensation is reduced. Sensory loss at first involves discriminative function (light touch, position sense, point localization, etc.). During this stage painful stimuli have a higher threshold of response but when the threshold is reached, the reaction is diffuse, irradiating and intense. Later painful stimuli are not perceived. As nerve regeneration occurs the sensory symptoms recover in the reverse order; that is, pain is perceived first. At the same time the motor power gradually returns, but the muscles are weak and easily exhausted.

The changes in the nerves described are accompanied by significant changes in the muscles. During the first week the muscle fibers are said to become swollen, edematous, hyperemic (especially venous hyperemia) and very sensitive to pressure. After about ten days the muscle fibers begin to atrophy and the sarcoplasm is reduced in amount. The cross striation may be preserved for a time. As atrophy progresses the nuclei of the muscle fibers proliferate by amitotic division and the connective tissue begins to increase in amount. Fat cells appear between the narrow muscle fibers and this may accumulate to a considerable degree. It may replace the other elements of the degenerated muscle fibers. The sensory ending and the motor end plates also degenerate. The walls of the blood vessels become thickened. In the simple atrophy from disuse the cross striations are preserved and there is no degeneration of the intramuscular nerve, nerve endings or blood vessels.

In atrophy secondary to an inflammatory or degenerative disease of the peripheral nerve there is more variation in the degree and spread of the process. Muscle atrophy is less pronounced than in cases where the nerve is severed. The atrophy of the fibers as described above has a patchy distribution lying beside more normal areas. Various degenerative changes such as fatty or muscular degeneration occurs. It is believed they depend upon toxic or secondary disease factors. The changes in a mild neuritis may be slight and may disappear after three to five weeks.

The changes in the muscles in lesions of the anterior horn cell are similar to those described in neuritis. There is considerable variation in the degree of change because the duration of paralysis and the rapidity with which it develops is a factor. In poliomyelitis, where the changes occur rapidly, the muscle fibers shrink and the degeneration is of a vacuolar or granular type. There is a loss of cross striations. This may be preceded by proliferation of the sarcolemmal and other muscle nuclei. The motor end plates degenerate within a week and the muscle fibers finally disintegrate and are replaced by fat and fibrous tissue. The intramuscular blood vessels exhibit capillary dilatation with hypertrophy of the endothelial nuclei and subsequent fibrosis. In the more chronic forms of *spinal muscular atrophy* with slow anterior horn cell destruction there is a marked variation in the picture. The muscle fibers may show many degenerative changes presumably of toxic or metabolic origin and there may be both hypertrophy of the muscle fibers and pseudohypertrophy due to the increase of fat in the tissues. As this disease occurs most frequently in older individuals it is not unusual to see increased growth of the connective tissue constituents and thickening of the blood vessels. The degeneration is patchy corresponding to the degree and number of nerve fibers lost.

The above description of the changes in the peripheral nerve fibers and muscles explains

why the diseases listed in the classification as spinal or neuritic are chronic in nature. An injury to the peripheral nerve produces symptoms and changes in the nerve fiber that are more or less proportional to the degree and type of injury. An intermittent compression of a nerve by a cervical rib may produce mild symptoms prolonged for a period of time. On the other hand a nerve crushed or torn by the fracture of a bone gives rise to immediate severe symptoms. This is followed by severe degenerative changes in the nerve fiber. A neuropathy of an individual nerve frequently is produced by pressure that pinches the nerve against underlying bone. Multiple or polyneuritis is most frequently associated with a systemic disturbance resulting from the ingestion of an exogenous toxin such as alcohol or lead or by a nutritional and vitamin deficiency. Bacterial infections such as typhoid fever may be complicated by a polyneuritis. A type of polyneuritis called "infectious polyneuritis" or "neuronitis" may be caused by a virus although this has not been proved. In all of the forms of peripheral neuritis the disease may be mild and last only a few weeks or be of great severity and last for many months despite adequate treatment. The average case of Bell's Palsy lasts from six weeks to six months.

Two forms of neural-neuritic muscular atrophy deserve special description. The first one, *hypertrophic interstitial neuritis*, was first described by Dejerine and Sottas. This is a rare hereditary or familial disease that begins in childhood and produces atrophy of the muscles of the distal portions of the extremities. In addition to sensory changes characteristic of peripheral nerve disease there occurs in this condition palpable enlargement of the nerve trunks. The peripheral nerve fibers are demyelinized and proliferation of the neurolemmal sheath of Schwamm forms a concentric-layered structure resembling an "onion bulb." Mucinoid and edematous material is seen between the nerve fibers and the perineurium and endoneurium shows a thickening of a myxedematous type of tissue containing a panchromatic staining substance. The disease usually is progressive.

The other neural-neuritic disease, the *peroneal-forearm type*, is called the Charcot-Marie-Tooth form. This is a rare hereditary disease that begins in adolescence and occurs more frequently in males than in females. The muscle atrophy in the lower extremities begins below the knees. The equinus deformity occurs early. The forearms are atrophic and the hands become claw-like. The muscles do not show pseudohypertrophy but they may show tremor and fibrillary twitching. The tendon reflexes are diminished. The extremities may be very painful and the skin often reveals peculiar vasomotor changes with coldness and a blue mottled appearance. There are mild changes in sensation from mild hyperesthesia to diminished sensation, especially to cold. The electrical reaction of degeneration usually is present. The disease is progressive but remissions are known to occur.

The Myogenic Forms of the Diseases of the Muscular System. This group of muscular disorders are called muscular "dystrophies" and are thought to be intrinsic diseases of the muscles themselves. Unlike the muscular atrophies described above, the muscular dystrophies have a tendency to begin in childhood or adolescence. They are hereditary or familial as a rule and are more frequent in males. The various clinical forms have as their basis a difference in age of onset or differ in the muscle groups first involved. They may be fundamentally a variation of the same disease process. Pseudohypertrophy of some of the affected muscles occurs to a striking degree in some cases. Cases without pseudohypertrophy occur but in most cases pseudohypertrophy can be recognized in some muscles at some stage of the disease. In these disorders fibrillary twitching does not occur (as in the muscular atrophies) but some twitches of small bundles of muscle fibers can be seen after exertion of the weak muscle groups. Another important differential diagnostic observation is the absence of the reaction of degeneration to the electric current. The muscles exhibit a quantitative diminution to electrical stimulation.

Some of the clinical forms are quite characteristic. The classical form of *pseudohypertrophic muscular dystrophy* was first described by Duchenne. It begins before the age of ten years and is three times more frequent in males than females. The disease attacks the thigh muscles first and spreads to the calf muscles, the muscles of the trunk and finally to the shoulder girdle and arms. Pseudohypertrophy is especially prominent in the calf muscles of lower extremities. It also is frequent in the triceps muscles of the upper arm. As the disease progresses, unequal atrophy takes place, the patients develop a lumbar lordosis and walk with swaying of the shoulders and waddling of the gait. The tendon reflexes

are diminished or absent but the Achilles reflexes persist for a long time. There are no sensory changes. The ultimate prognosis is poor but the disease may be protracted over a period of many years. In general, the earlier in life the disease begins, the more rapid the course of muscular dystrophy. The hereditary form described by Leyden-Möbius resembles the Duchenne type. In this disease there is no muscular pseudohypertrophy and the muscles of the back and pelvic girdles are involved first. The muscles of the legs become involved later. The hereditary type described by Erb also resembles the Duchenne form with the exception that the disease begins at puberty and affects the shoulder girdle muscles first. Pseudohypertrophy is present.

In the *facio-scapular humeral type* described by Landouzy and Dejerine, pseudohypertrophy does not occur. The disease begins in the face with paralysis around the mouth giving a peculiar appearance referred to as "Tapir mouth." Ptosis may occur. The disease spreads to the muscles of the shoulder girdle, the humeral muscles and later to other muscle groups. The patient develops difficulty in chewing, swallowing and in breathing. A *distal type* was described by Gowers. It resembles the peroneal-forearm type of progressive muscular atrophy so far as muscle distribution is concerned but otherwise it has the clinical characteristics of a muscular dystrophy. *Mixed and transitional forms* without pseudohypertrophy were described by Erb and Zimmerlin. There is no reason for continuing to differentiate all of these clinical types except for historical interest since they all appear to be variations of the same disease process.

The pathologic changes in the muscle in the muscular dystrophies are different from those seen in the muscular atrophies in many respects. The changes vary with the stage of the disease. In the early stage there may be no changes at all. Later there are severe changes of the entire muscle. The degree of muscular degeneration may vary in different muscles of the same patient. In a moderately atrophic muscle the muscle fibers vary in diameter between very small and very large fibers lying side by side. The interstitial tissue is increased and becomes greater in amount as atrophy progresses. An increase of fat in the interstitial tissue also occurs. The nuclei of both large and small muscle fibers proliferate and frequently form a bead-like chain along the muscle fiber. They also may be irregularly arranged, some beneath the sarcolemma and others within the muscle substance. Some of the nuclei are large and vesicular with one or two nucleoli, others are small oval or rod-shaped and stain densely. As a rule the cross striations are visible but they may disappear. Degeneration of the muscle substance occurs when other diseases intervene. The hypertrophic fibers on cross section are round and vary from eighty to two hundred and fifty mu in diameter. They may exhibit no cross striations. The hypertrophy is a forerunner of atrophy and occurs in the early and severe forms of the disease. The sarcoplasm forms clear masses which probably become vacuoles later. This change in the sarcoplasm is characteristic of the dystrophies. In the neural atrophies this change does not occur early and the nuclear proliferation tends to be peripheral rather than within the muscle substance. Fat may occur in the muscle itself, especially in the atrophic fibers. The blood vessels and muscle spindles are normal as a rule. In severely atrophic muscle there is much fat and connective tissue produced. Lying within this a sparse number of muscle fibers undergoing various degrees of degeneration are present.

The last group of diseases of the muscular system have not been classified with the dystrophies and it is difficult at the present time to say definitely just where they belong. In general these diseases are of two types. One group shows a loss of responsiveness and contractibility of the muscles after use. The other group shows a myotonic reaction which interferes with the initiation of muscular contraction. After contraction is initiated, the ease of contraction improves. The most important example of the first group is *myasthenia gravis*. This rare disease begins as a rule between fifteen and thirty years of age and is more frequent in the female sex. Recurrent attacks of flaccid paresis or extreme muscular weakness, insidious in onset, occur. The attacks may last a few hours or a number of days. It affects the muscles supplied by the cranial nerves. The most frequent clinical signs are ptosis or strabismus, difficulty in biting, chewing and talking. The muscles of the extremities may be involved to a variable degree. There is no fibrillary twitching. The tendon reflexes are diminished or soon disappear and there is a rapid fatigue and diminished contractibility of the muscles. The function returns after a period of rest. The muscle is rapidly exhausted by faradic stimulation and soon fails to contract. The disease runs a changeable course with remissions and

relapses but in most cases eventually is fatal. Histologically, the muscles may appear normal or show clumps of round cells lying near the blood vessels in the connective tissue. Some of the etiologic factors in this disease are now better understood. The muscle weakness is caused by rapid fatigue or exhaustion during contraction. This has been thought to be due either to insufficient acetyl-choline formation at the motor plate or to its excessive destruction by choline esterases present in the tissues. A recent study revealed normal values for the blood esterase in myasthenia gravis. The inhibition of this effect by the action of eserine (or by prostigmine, another parasympathetic stimulant which acts strongly on the skeletal muscles and less on the visceral organs) has proved of great value, both as a diagnostic aid and therapeutic agent. Prostigmine lowers the blood level of acetyl-choline esterase. The potassium ion is believed to enhance the effectiveness of this drug.

Another disease characterized by recurrent attacks of flaccid paralysis is *familial periodic paralysis*. It usually begins between the fifteenth and twenty-fifth year and occurs in different members of the same family. The disease is about equally distributed between the male and female members of a family. The attacks, like those of myasthenia gravis, begin insidiously, frequently during sleep, and affect in most cases the lower extremities, although any muscle group may be involved. The muscles supplied by the cranial nerves are rarely affected. During an attack the muscles exhibit a pure flaccid paralysis of variable degree and duration with diminished or absent tendon reflexes, rapid fatigue or absent response to the faradic current. There are no sensory changes or fibrillary twitching of the muscles. The attacks may be accompanied by or alternate with attacks of migraine in a given patient. The disease is not fatal but lasts throughout the patient's life. It is benefited by the effect of the potassium ion and, some claim, by prostigmine. The pathogenesis of the paralysis is not known. It is also not known whether there is any relationship of this disease to myasthenia gravis. A defect in the metabolism of phosphorus has been found.

Amyotonia congenita or Oppenheim's disease is classified in the same group with the two above conditions, but it is included only because of the myatonic muscular state. This disease probably is closely related to the muscular atrophies, especially the Werdnig-Hoffmann type. Some believe the two diseases are identical, except that Oppenheim's form begins in fetal life. Histologic studies indicate that the anterior horn cells are diminished in number or degenerated. The muscle fibers are small and resemble fetal muscle fibers that have no nerve supply. Large fibers also may be present. In general, the number of muscle fibers are reduced. The disease is congenital and usually is recognized at birth or during the first six months of life. The muscles are very soft and hypotonic and permit excessive joint excursion unless contractures have occurred. The loss of muscle tone is out of proportion to the weakness. The proximal muscles of the extremities, especially in the lower limbs, are most involved, although the trunk and neck muscles may be affected in some cases. The muscles are weak and appear small in volume but this may not be apparent because of excessive fat. There is no fibrillary twitching and the tendon reflexes are diminished or absent.

The faradic current produces rapid exhaustion (myasthenic reaction of Jolly) or the reaction is diminished or absent. The child may die in the first year of life or improve to a degree. There is no progressive tendency in this disease and death usually results from secondary infection.

The myopathies characterized by myotonic reactions present a strange contrast to the myasthenic conditions. *Myotonia congenita* or Thomsen's disease is the best example of the myotonic type. This disease is both hereditary and familial and affects males and females alike but is probably more frequent in males. The disease begins in childhood and is first recognized in puberty or earlier. Any muscle group may be affected but the lower extremities most frequently are involved. The muscles usually are bulky and show a delayed relaxation after voluntary stimulation. For example, the patient may be unable to relax the grip promptly after grasping an object. The legs may stiffen in beginning to walk or run. After the muscles have contracted a few times they become more easily relaxed and the function approaches normal. Cold weather, fatigue or emotional reactions increase the myotonia. The muscles show a prolonged contraction upon percussion, and repeated blows may lead to tetanus. In typical cases the faradic current produces a strong contraction which persists after the current is shut off (myotonic reaction of Erb). With repeated

stimulation the response approaches normal. There is no muscular atrophy or fibrillary twitching. The affected muscles show hypertrophy of the muscle fibers. They have been described as "primitive" in type with indistinct striations and increase of the sarcolemmal nuclei. The internal perimysium is mildly thickened as a rule. This disease responds symptomatically to quinine but the action of this drug is not known. It may act as a depressant of the motor end plate. Prostigmine may make the symptoms worse. Eulenberg described a congenital condition of myotonia, present only during cold weather, which he called paramyotonia. It may be related to or a type of Thomsen's disease. The face is more affected than the limbs in this form and the electrical reactions are not typical. There may be actual diminution of electrical excitability.

The condition described by Hauptmann under the term *dystrophia myotonica* is a hereditary disease characterized by both muscular wasting and myotonia. The disease usually begins between the ages of twenty and thirty years and involves the face and all of the body musculature. The muscles are atrophic despite the myotonic reaction to the electric current or to mechanical stimulation. Weakness is ordinarily profound and fibrillary twitching may occur but as a rule this is not present. The tendon reflexes are lost late in the disease. The patient becomes emaciated, ataxic in walking and some patients develop vasomotor symptoms, alopecia, cataracts and impotency. The changes in the muscles are similar to those in progressive muscular dystrophy. In addition, the endocrine glands become atrophic. In the testes, pituitary, adrenal and thyroid glands there may be increase of connective tissue and degeneration or atrophy of the parenchymatous cellular elements.

The relationship of many of the muscle disorders to the endocrine glands is still a debated and unsettled problem. Attempts have been made to relate myasthenia gravis to disease of the thymus and to hyperthyroidism. Thyroid dysfunction also has been considered a factor in the etiology of family perodic paralysis. In the progressive muscular dystrophies a relationship to endocrine dysfunction has had its adherents and opponents. Cases of dystrophy have been associated with diseases of the thyroid, pituitary and pineal glands. Aring and Cobb believe that those glandular disturbances are linked in heredity rather than in a causative sense. In dystrophia myotonica, pluriglandular deficiency is a consistent companion to the muscular disorder. The autonomic nervous system being closely linked to the endocrine organs also has been implicated in theories to explain some of the muscle disorders. Sympathetic fibers are no longer believed to innervate skeletal muscle directly but they do influence the activity of striated muscle by way of chemical changes produced in the fluid medium and by their influence on the blood vessels in the muscles. Some workers believe that myotonia is due to increased autonomic activity.

(Editor's Note: This is the second part of the article by Dr. Steegmann. Part III will appear in the next issue.)

Dysarthria and Dyslalia in Crippled Children

Sara Stinchfield-Hawk, Ph. D.

Dysarthria is defined as a speech disorder due to disturbances of innervation to the muscles controlling the speech mechanism.[1] It usually implies involvement of the central nervous system due to lesions affecting various parts of the brain or of the peripheral nerves. It may be associated with trauma, inflammatory conditions, febrile infections, degeneration or agenesis of parts of the central nervous system, as in encephalitis, poliomyelitis and birth injury, or may be a consequence of injury to the brain, sustained as a result of some childhood disease of unusual severity accompanied by high fever. The history of convulsions in early infancy also is highly significant in speech cases.

The speech signs which help in the identification of the speech disorder vary from complete inarticulateness as in anarthria; to la-

Director, Speech Clinic, Orthopaedic Hospital, Los Angeles, Calif., and President, American Speech Correction Association.

bored, difficult speech as in bradyarthria, to rapid, ataxic, staccato speech, or slow, difficult, spasmodic speech as in mogiarthria.

With the spastic child the speech usually is slower than average, labored and indistinct. "Breaks" in the voice frequently occur especially in the male. The degree of speech disability depends upon the nature and extent of the lesions which have taken place and the amount of damage which has occurred to the cerebral cortex. In general the greater the area of physical involvement, as in quadriplegia, the poorer the control of the speech centers. Although it does not always follow, one anticipates less injury to the speech centers in cases of monoplegia than in diplegia, hemiplegia or quadriplegia. The mental outlook also depends upon the extent of the brain injury.

Dysarthria may be found in many cases of pseudobulbar palsy, in bulbar palsy, general paresis, birth injury, disseminated sclerosis and sometimes following anterior poliomyelitis and encephalitis. It occurs in other diseases and disorders, but we are concerned chiefly with those types which appear most frequently in the hospital speech clinic and which represent the greater number of patients which may be treated by the speech clinician with some degree of success. Such patients have been received in the speech clinic of the Orthopaedic Hospital of Los Angeles, under my direction, for the past eight years, in the weekly Saturday morning speech work.

Children varying in age from two and one-half to eighteen years are referred by the members of the hospital staff. A student-teacher is assigned to work with the patient under the supervision of the director, and each patient is given individual training rather than group conferences because we feel that such patients progress most rapidly in this way. Approximately half an hour is allowed for each individual speech "conference." Suggestions for follow-up work are given to the mothers, and their cooperation has much to do with the success of the training. Older children are capable of applying the suggestions and of following up the training with intensive home work by themselves, but with the younger children the mother's cooperation is especially sought as we feel it to be vital to the speech therapy. Mimeographed outlines for home work often are given to the child to make the home work more definite, to serve as a reminder and to clarify objectives from the parents' point of view.

By far the greater number of children received in the hospital speech clinic are dysarthria cases. Dyslalia stands in second place, with dysphemia or nervous speech disorders, such as spasmophemia or stuttering taking third place. The former director of the clinic, the late Dr. Charles Stivers, found in his survey that about nine per cent of the hospital cerebral palsy cases had speech defects, as against about two per cent of ordinary public school children. We find the percentage, over the last eight years, to be even higher. This may be due to the increased strain wrought by modern civilization or to the fact that the speech defect is recognized earlier by diagnosticians so that more children are referred to the clinic.

Dyslalia differs from dysarthria in that there is no cerebral involvement, the central nervous system being intact; but there may be functional or organic defects and deficiencies which account for the presence of the speech difficulty. Of such a nature are post-operative cleft-palate cases in which the excessive nasality persists even after a successful surgical operation. Speech disorders in other cases may be due to some misuse of the vocal organs, poor speech habits, shallow breathing, faulty voice training, physical debility following some disease of childhood, to such habits as thumb-sucking, to hypertrophied tonsils or adenoid tissue. Even in post-operative cases the speech defect often persists unless special training is given to break up the unfortunate habit-pattern. There also are many cases of infantile perseverance where baby-talk and letter substitutions are carried over far beyond the early period of speech building.

In dyslalia there may be only a slight articulatory defect, such as the elision of syllables, the omission of final consonants, telescoping of words or lisping as on the S and Z sounds. This latter is one of the most frequently occurring of articulatory difficulties and is surprisingly frequent in the civilian population. Again, speech may be slurred and abbreviated as in the case of the hard-of-hearing child. It may be utterly unintelligible in children of normal or even superior intelligence. In such cases the environment usually is faulty in some way from the standpoint of speech development and mental hygiene.

We referred to dysphemia or nervous speech disorders as of third rank in our speech clinic. Spasmophemia or stuttering is one of the most easily recognized of speech disorders. It occurs at all ages and among all conditions, in practically every kind of environment. It is mentioned by ancient writers and in Biblical history. It has been in the focus of attention among speech clinicians for all time and has been discussed widely in the literature in this field. Recently the American Speech Correction Association devoted most of its sessions for two annual conventions to the discussion of the causes and treatment of spasmophemia or stuttering.[2] There is a wide diversity of opinion regarding the subject, on the part of the leading specialists in the field in this country and abroad.

DYSARTHRIA

Under the term birth palsy we find a variety of commonly used terms, such as spastic paralysis, cerebral palsy, Little's Disease and birth injury. The examination of such patients shows that the brain cortex may have been injured during or previous to birth or that there may have been a defective germ plasm to begin with. Circulatory disturbances sometimes interfere with brain nutrition during the fetal stage of development, causing permanent damage to the brain cells. The pyramidal tract may have been underdeveloped at birth. In breech presentation there sometimes is injury to the brain coverings. High or low forceps delivery, difficult or prolonged labor may have played a part in the injury wrought upon vital parts of the brain and nervous system.[3]

In spasticity there is a diffuse discharge of energy to various related muscles whenever the child attempts to speak. He may easily become exhausted in the effort to speak a very few words. He may be capable of uttering only a few unconnected sounds and be unable to blend the separate sounds into meaningful word-patterns even though he knows perfectly well what he wishes to say.

In spastic speech we often find a glossopharyngeal involvement; the lingual or labial muscles or both may be affected; the jaw movements cannot be synchronized properly during the act of enunciation, and the sounds are not blended into words with the normal timing or in normal sequence. The result is choppy, unrhythmic, labored utterance and meaningless activity of muscles not ordinarily used in talking. Because of the normal or even superior intelligence of many spastic children, they often are highly sensitive and capable of prolonged and well-sustained efforts to help themselves overcome the speech disturbance. Unfortunately, due to the spasticity and general bodily condition, such patients frequently are diagnosed as feeble-minded or are given indeterminate I.Q.'s because they are unable to make the responses which are required in standardized tests even though they understand perfectly well what is expected of them. We still lack well-adapted tests to determine the intellectual capacity of such children. It is a fact that in such cases the acquisition of speech helps the child to tune in a whole new world of sensory impressions and gives him a magic bridge over the chasm which previously has separated him from his kind. It sets in motion perceptions which stimulate his intelligence so that it begins to function in a normal way and proves that we cannot always safely label such children as mentally deficient and incapable of improvement beyond the point represented by the first I. Q. obtained on a standardized intelligence test. Although the constancy of the I. Q. seems to hold for the normal child, psychologists have too readily assumed that a child who tests very low or below average on a first test always must be expected to function at the same level. On Stanford Binet tests, old and new forms, on Kuhlman and others we frequently find a surprising advance in I. Q. in handicapped children following speech training, surgical treatment, medication, posture clinic and other similar corrective measures.

Experiments with the socialization of crippled children at the Orthopaedic Hospital of Los Angeles have shown excellent results in the way of personality development, loss of self-consciousness and unsocial attitudes, in the development of a desirable amount of aggression and in verbalization as a social instrument. Carefully chosen plays and pageants have brought surprising improvement in posture, in ability to walk, in muscle tonus, muscle control, relaxation and happiness. Pool therapy and medication play an important part in the treatment of many cases in this hospital. The patients' ability to manage themselves and their affairs with foresight and practical common sense is another evidence of their improved social adjustment and ability to accept their handicap.

Speech training often is a helpful prophy-

lactic measure in the education of the crippled child of any type.[4] It is by no means hopeless to give such training to children of limited intelligence, as any child is happier when he is able to communicate with others, to make his wants known and to realize greater social satisfaction through the magic of speech. There also is little doubt that some children, speechless for a protracted period, have become so delayed in speech development that when corrective measures are begun it is too late to prevent permanent retardation by deprivation. Speech training should be begun the moment a child shows the need of correction for defective articulation or if he is delayed beyond the average age for learning to talk. The golden age for developing right speech habits is between the ages of two and three years, or certainly previous to the time he enters school. The older the child, the longer the time required for speech correction, almost without exception.

Dyslalia cases are more easily helped than dysarthrias, as there is no cerebral involvement or at least no serious lesion within the central nervous system. The letter substitutions, oral inaccuracies or lisping speech found in such patients represent the majority of speech cases found in the public school corrective departments. Usually fewer of the dysarthria cases than dyslalias reach the public school because of the physical handicap, except in large city systems such as Los Angeles where special schools, special classes and bus transportation are provided for crippled children. An entire building has been set apart, with physicians and nurses always in attendance. The more severe cases are those which eventually reach the hospital speech clinics.

DYSLALIA

In dyslalia there is a perseverance of infantile speech habits so that the old pattern not only must be broken up but new habits of speech trained in if the child is to overcome his speech difficulty. It requires more time to make this transition from old to new than to train in the correct speech habits at the outset. This is a point which cannot be too strongly stressed with parents of children learning to talk. The longer the false habit persists, the harder it is to eliminate.

There are a surprising number of children who do not acquire speech at the usual age. We call them "speechless" children. They often are very hopeful from the standpoint of the speech trainer, as the delay in speech frequently is due to some condition in the home, such as overdomination by one or both parents or by older children; self-consciousness in a timid child may have retarded the development of verbalization; severity and harshness may have led to fear of speech and to consequent stuttering; in a bilingual situation the child must think and speak in two languages. In some homes the maids employed speak such poor English that the child fails to understand whether he is to regard the speech of the parents or that of the servants as the desirable model to follow. Some children are not strongly visual or auditory in their thinking. They often need to acquire speech through the careful building up and storing of muscular patterns used in speech and through kinesthesis learn the correct sequence of movements required for forming words. One school in Los Angeles devotes its entire time and staff to the training of such children.[5]

METHODS

In our clinic we use whatever method and type of speech training seems to be indicated according to the needs of the child. We do stress the moto-kinesthetic training of the child into forming normal speech patterns for all of the sounds of language. We seek to enrich the sensory experiences of the child through the use of objects, toys, pictures, books, games or whatever will deepen the sensory impressions associated with what he is trying to say. Special exercises and devices have been worked out for our children. Cooperation with other departments of the hospital is stressed, and one is impressed with the possibilities suggested by such work and the need for greater endowment for the adequate development of the speech clinic. While other departments of most modern hospitals usually are well endowed, the speech clinic often is left insufficiently equipped, with too few helpers and even with apathy on the part of most of the staff. We feel that the speech clinician must do a good deal of work to educate the public and the medical and psychological profession to the needs, to the possibilities and to the opportunity for community service found among those with this type of disability.

Speech often is the "Open Sesame" to every kind of human endeavor. The earlier it is acquired and the sooner the child is able to verbalize his thinking, the more useful he becomes socially. Verbalization aids in nor-

mal thinking, in finding short cuts to action. Watson, the psychologist, has said that ideas are useful only when they find expression in words, spoken or written. Never in the history of the world has the need for adequate self-expression through speech been greater. The very trend of world events shows that democracy cannot afford to be less expressive or less fluent than its adversaries.[6]

As examples of what may be expected of older children with articulatory difficulties, we have included a few exercises. These involve reading and cannot be used to advantage with the very young children. Motokinesthetic training for acquiring the correct speech patterns and learning *by doing*, without depending entirely upon the auditory and visual impressions, is the most productive of results with younger children. Letter and word concepts are more easily acquired when the visual and auditory impressions are blended with the motor movements and the feeling of the muscles as they form the necessary patterns, gliding from syllables into entire word-wholes, and blending or fusing the sounds in the proper sequence. One should never teach these younger children to sound out letter by letter or to separate the initial consonant from its accompanying vowel, else there may occur a "speech fixation" at this level, and the child may continue to sound out the word cat as though it contained three isolated sounds such as "kuh," "a" and "tuh." This is not the proper blending of sounds as normally used in saying the word *cat*. The first two sounds should be blended like "ca" and be followed quickly by the final "t" sound, giving the effect of the entire word. If the final consonant is omitted, one should still insist upon the first consonant and vowel, training in the final consonant as soon as it can be acquired by the child.[7]

We have found it useful to have the child imitate sounds of animals, as he often can give these first sounds of beginning consonant and vowel when he cannot give an entire word. He may say "moo" for the sound of the cow, and "bow-wow" for the word *dog*, while he is still unable to sound the more difficult consonants which occur in the words *cow* and *dog*.

Gaining concepts of tridimensional space through handling objects, playing games and forming associations, is extremely important in the treatment of all such patients.

Examples of Training Exercises

BEGINNING LESSONS IN ARTICULATION—LESSON I

1. Blowing exercise Wh. Voiced sound—W
2. Aspiration, using H sound.
3. Labials, P, B, and M, (which are among earliest sounds, usually.)
   Develop P sound: motor-boat illustration.
   Develop B sound; sound dog makes in barking.
   Develop M sound: humming sound.
4. Combine with vowel sounds as:
   pah, pay, pee, paw, poh, poo
   bah, bay, bee, baw, boh, boo
   mah, may, mee, maw, moh, moo

(diphthongs)	(words)	
pie, poy, power	papa	pipe
buy, boy, bower	baby	boy
my, moy, mower	mama	me

5. Use illustrations in picture book and try to name objects pictured under the P, B and M sounds; the W and Wh and H sounds.
6. W, Wh and H.
   whah, whay, whee, whaw, whoh, whoo
   wah, way, wee, war, woe, woo
   hah, hay, hee, haw, hoh, hoo

We wait	We come	wheel	whoa
We go	We say	we	what
why, whoy, whower		hat	wee-wee
wye, woy, wower			ha-ha
hye, hoy, hower			

SECOND LESSON

1. T and D and N, (tip of tongue sounds).
   T, the sound the clock makes when it ticks.
   D, the sound you make when you talk about the dog.
   N, another humming sound.
2. Combine with vowels:
   tah, tay, tee, taw, toh, too
   dah, day, dee, daw, doh, doo
   nah, nay, nee, naw, noh, noo

tie, toy, tower	toe	to	two
die, doy, dower	dog	Dick	
nigh, noy, nower	no	nut	

3. *Sentences.*

Take the tie	Take the toy
Take the tea	
Take the doll	Tell the boy
Take the tower	
The doll is not in the tower.	No, do not go to the tower.
The boy is in the door.	I will be there in an hour.
Who is in the house?	Where is the horse?
Where is the boy?	Where is the toy?
We are on the way.	Are you on the way?
Who is on the way?	Who is at the door?
Where is the bear?	Where is the doll?

4. Make up words and say them with child, using any of the above sounds, viz.: w, wh, h, p, b, m, or t, d, n.
5. Practice on words under T, d and n in picture book; and assign practice at home.

Foote: Most phoneticians agree that the labials p, b and m, the tip-of-tongue t, d and n sounds and the back of tongue k, g and ng sounds are

among the earliest acquired of speech sounds and they are often spoken of, therefore, as "primitive" speech sounds, being common to all modern languages, and apparently being more easily acquired than sounds which are made with the back of the tongue, middle of tongue-blade, or by lip protrusion as on the sh, zh, ch and j sounds.

TYPICAL LESSON FOR LISPERS

Articulation exercises. S and Z sounds in various combinations.[a]

In normal speech the sound of S is articulated by placing the blade (or tip) of tongue against the ridge of the upper teeth, the front of the tongue being raised in the direction of the hard palate. The teeth should be close together or only slightly separated. Some speakers pronounce the sound with the tip of tongue lowered, but the majority of speakers use the (against upper teeth) raised position. It is important to speak these sibilants with the uppers slightly over the upper borders of the lower teeth in order to get good resonance of sound and to prevent protrusion of tongue between teeth.

1. *Exercises for practice.*

sale	sigh
sane	side
saint	shine
scene	sow
same	sold
seem	soap
seed	sole
seal	sow
seek	soon
sea	seethe
sign	soup
sight	superior

2. *Sentences.*
   1. He saw the gleaming cross beside the roadside.
   2. At sight of the spectacle his resentment arose.
   3. I saw the picture of Saint Cecelia in this chapel.
   4. Have you seen the present which Santa Claus brought my sisters?
   5. It is absurd to use so much ink on this paper.
   6. Please place the vase on the opposite side of the shelf.
   7. This is the latest atlas. I am certain.
   8. The child stirred restlessly in his sleep.
   9. If you insist, I shall be pleased to repeat the ghost story.
   10. The ice is melting so rapidly that the skating is unsafe.
   11. After a stormy session, Saul listened to the songs.
   12. The sounds of the Zither resounded through the prison walls.
   13. She saw the ship, a shining shape, upon the glimmering sea.
   14. The falls of the Southland were rising and leaping as they tumbled over the sharp rocks.

Z sounds. Z is a voiced consonant, corresponding to the voiceless or "whispered" sound of S.

1. *Practice words*:

zone	please
Zola	dozen
observe	Zulu
trees	scissors
seal	dogs
zebra	busy
reserve	Zounds
gives	zones
Zion	pegs
zest	dissolve

2. *Sentences.*
   1. Susan was resolved to see the Zebra at the Zoo.
   2. I have observed the cause of his complaints against the laws.
   3. It gives her pleasure to do kind things for others.
   4. Zola was an exile from France, because of political reasons.

---

a—*S* and *z* are especially difficult sounds for many children and adults. They are called high-frequency sounds and in many cases where there is a deficiency of hearing children fail to hear them correctly and form the wrong patterns of movement in articulation of these sibilants.

BIBLIOGRAPHY

1. Robbins, Stinchfield and Russell: Terminology Dealing with Defective Speech. Amer. Speech Correction Assoc., Boston, 1931 and 1940.
2. Proceedings, Amer. Speech Correction Assoc. R. West, Editor, Univ. of Wisc., Madison, Wisc.
3. Stinchfield, D.: Speech Disorders. Harcourt Brace Co., New York, 1933.
4. West, Carr and Kennedy: The Rehabilitation of Speech. Harper and Bros., New York, 1937. Pp. 289-294.
5. Stinchfield and Young: Children with Delayed and Defective Speech. Stanford University Press, 1938.
6. Johnson, Wendall: Language and Semantics. Univ. of Iowa, 1938. (Monograph for the Inst. of Semantics, Chicago, Illinois.)
7. Stinchfield and Young: Op. Cit.

Hugh Owen Thomas.—Now Hugh Owen Thomas was the son of a bone-setter who practiced in the same district of Liverpool in which his son afterwards lived and practiced. Moreover, Evan Thomas, the father, was the seventh bone-setter in lineal descent, the previous six having been farmers in Anglesey who also practiced the art of dealing with injuries. There is no doubt that they were held in high esteem, for one evening Sir Robert Jones showed me a series of cuttings from old newspapers extolling the services rendered by various generations of this family, and their virtues have been recorded in Welsh song.—*Power, Sir D'Arcy: British Masters of Medicine, Baltimore, William Wood & Co.*, 1936.

The Rationale of the Use of Physical Therapy in Peripheral Vascular Diseases

Roy J. Popkin, M.D.

The subject of peripheral vascular diseases is assuming increasing importance in the field of medicine and surgery. This is due not only to a better diagnosis and recognition of the newer methods of treatment but also to the fact that more people are living to the age group where the most common of these diseases, hardening of the arteries, frequently occurs.

Peripheral vascular diseases comprise those affections of the extremities which are due to an insufficient amount of circulating blood. This decrease of an adequate blood supply in the majority of cases is due to a reduction of or a closure of the vessel channel. This is brought about by organic changes primarily in the vessel wall. In occasional cases, as in polycythemia vera, the thickened blood clogs the smaller vessels, thereby restricting the circulation. Emboli also may be a factor in circulatory diseases by occluding major arteries. The physical therapist is called upon to treat all of these diseases. The important ones are arteriosclerosis obliterans, known as hardening of the arteries; thrombo-angiitis obliterans, or Buerger's disease; and vasospastic disorders of which Raynaud's disease is the best example. Other vascular cases consist of varicose ulcers, thrombophlebitis and scleroderma.

In arteriosclerosis and Buerger's disease there is a reduction in the arterial bed through organic closure of the vessel. The walls become thickened and bulge inward, finally closing off the lumen. The process is hastened through inflammatory changes, local ulceration and blood clotting. Arteriosclerosis usually affects those past 50 years of age, whereas Buerger's disease affects younger individuals, usually males. The irritation of the vessel wall, due to the scarring and inflammatory reaction, causes a spastic contraction of the circular muscles in the artery wall. This further reduces the caliber. The spasm may be very extensive, involving the collateral and tributary vessels. In the vasospastic disorders, such as Raynaud's disease, the circular muscles are under a constant abnormal tension. On exposure to cold these muscles contract, closing the arterial lumen.

In cases of organic closure the individuals suffer when the development of new blood channels cannot keep pace with the destruction of old ones. The body contains a tremendous number of small and little-used vessels. These are dilated and enlarged to take over the functions of the diseased arteries. Thus the aim in treatment is to check the destructive process and to hasten the formation of an adequate collateral circulation. Little can be done to open a vessel closed by an organic obstruction. The symptoms complained of are due chiefly to tissue changes brought on by lack of oxygen and nutrition. The blood flow is not sufficiently rapid or in amounts large enough to care for the normal tissue demands, and metabolism is decreased. This explains the slow healing of ulcerations. The chief symptoms are coldness, intermittent cramps, pains, undue tiredness or early fatigability on walking short distances. There may be paresthesias, numbness and trophic changes. Ulcers may develop which heal slowly, or there be frank gangrene. Raynaud's disease involves principally the fingers which become cold, numb and painful on exposure to reduced temperatures. In all of these cases there are color changes of white, red and blue, depending upon the oxygenation and volume of blood.

Treatment is directed at the reduction of spasm and the development of a collateral circulation. Spasm is reduced chiefly through the application of heat and medication. The collateral circulation is developed through postural exercises and the use of modalities such as intermittent venous occlusion, alternate suction-pressure and the oscillating bed. The application of heat is of great importance. Although it is of major benefit, it may also

2007 Wilshire Blvd., Los Angeles, Calif.
Peripheral Vascular Disease Service of the Cedars of Lebanon Hospital, Los Angeles, Calif.

be a source of danger. This is due to several factors:

1. Faulty heat distribution. Ordinarily excess heat is carried from one part of the body to another by means of the circulating blood. If an extremity is exposed to heat, the heated blood is carried to cooler parts. Cool blood rushes to the warm area equalizing the temperature. In cases of deficient circulation, the injudicious application of heat causes an accumulation in the tissues. Blood does not flow in or out with sufficient rapidity or in large enough quantities to dissipate this heat. The heat accumulates, resulting in burns.

2. Decreased sensibility of the nerves. One of the first tissues to degenerate as a result of vascular deficiency is the nervous tissue. A greater intensity of stimulation than is normally needed is required to produce a given sensation. In many cases excessive heat is applied before a patient feels it, and a burn might result without the patient being aware of it.

3. Increased metabolism due to heat. The metabolic activity of the tissue cells is greatly increased. They require more oxygen and more waste products accumulate. In vascular deficiencies with the reduced arterial bed, there is not enough blood to carry the necessary additional oxygen. This is why many of these patients complain of pain when heat is applied. The cells suffer from oxygen want, and pain results. If the limb remains cool, the metabolism is kept down to a minimum, thus accounting for the comfort experienced by many patients on exposing their limbs to cool temperature. The demand of the tissues for oxygen is brought down to the capacity of the arterial bed to carry it. If too much heat is applied the tissues suffer from oxygen want and die of suffocation. Gangrene is brought on early. It is not an uncommon occurrence following the prolonged application of a hot water bottle.

The desired results and important modalities to be used are as follows:

Reduction of spasm.

1. Heat, using the short wave diathermy, electric light cradle, infra-red, whirlpool baths or Sitz baths.

2. Galvanic current, using mecholyl or histamine by iontophoresis, or ionization.

Development of collateral circulation.

1. Intermittent venous occlusion, alternate suction-pressure, postural exercises and oscillating bed.

The main use of heat is to relax spastic vessels. In all these cases there are varying degrees of spasm. In the arteriosclerotic and Buerger's cases, the organic occlusion may be marked, spasm being only a minor factor. In early cases, however, before this structural occlusion takes place, spasm may be a great factor in symptomatology. Spasm may be so intense as to close off completely the circulation to an area. This is found especially in Raynaud's disease where the prolonged contraction of the digital arteries may lead to gangrene of the finger tips. Likewise in emboli the accompanying spasm of the collateral vessels may be so intense as to lead to an acute circulatory deficiency. Heat is applied to other parts of the body to increase the general circulatory rate, and these tissues, as they become heated, require more blood. This causes an increased heart rate with an increased rate of blood flow throughout the body. The diseased area benefits as more blood is brought to it also.

Short wave diathermy is the most efficient means of heating the tissues. It should be used when the patient is under constant observation. The surface of the limb must be palpated constantly to see that it does not become too warm. It should not be applied in cases where circulation is grossly inadequate, as in ulceration or gangrene. Great care must be used to avoid burns. It is extremely important that the patient be questioned frequently as to pain or aggravation of symptoms.

The electric light cradle at the foot of the bed frequently is used. The temperature should be between 92 and 95 F. or even less if the patient complains of pain. Its main use is for constant application of mild heat. Spastic vessels relax under its influence. The cradle also acts as a support to keep the weight of the bed clothes from the patient's feet. The Sitz bath, using plain water at a temperature of 100 F. also is of aid in reducing spasm. Ordinarily baths for ten minute periods are adequate, especially when the patient is past middle age. The whirlpool bath is an excellent means of applying heat locally. The massaging action of the activated water is of great value. The infra-red lamp frequently is used to heat other parts of the body, thus stimulating a general circulation.

Spasm also is reduced by drugs acting directly upon the affected area. For this we use the galvanic current which forces drugs from one electrode to another. The active electrode is placed over the affected area and the in-

different electrode usually is placed over the abdomen or back. Mecholyl and histamine are the drugs most frequently used. Mecholyl acts by stimulating the parasympathetic nerves. These nerves control the dilator muscle fibers of the artery wall. When they are stimulated the vessel dilates. Histamine acts principally on the capillaries and precapillary arterioles and dilates them. The advantage of ionization is that a large concentration of a potent drug is applied directly to the area where it is most needed. This obviates oral administration with the possibility of destruction of gastro-intestinal juices, poor absorption and poor distribution by the blood stream. As the blood supply already is inadequate, one can see how little of the drug finally reaches the spot where it is most needed. The galvanic current also has a slight dilating action.

Ionization, used in the treatment of varicose ulcers, increases the rate of blood flow and reduces stagnation. The electrode never should be applied over the ulcer area as the current would localize in this site with burns resulting.

The development of collateral circulation by direct mechanical action is accomplished by the intermittent venous occlusion machine, postural exercises, oscillating bed and the alternate suction-pressure apparatus. The intermittent venous occlusion machine produces the best results. In the treatment of a leg, the cuff is applied above the knee and intermittent pressure is applied, restricting the venous return but not the arterial inflow. The pressure is below the systolic blood pressure, usually about 60 millimeters of mercury. During the constriction phases two things happen. The damming back of the venous return causes the blood to back up, filling all channels. This constant stretching of the vessels causes a permanent dilation, increasing available space for the circulating blood. The other action is based on the release of a histamine-like substance during this phase. As the return flow is hindered the blood does not move on and oxygen is used up. This results in a tissue reaction. The tissues release a histamine substance which dilates the capillaries and precapillary arterioles. When the constriction is released more blood flows in than was possible before constriction.

Edema of the foot frequently results following the use of intermittent venous occlusion even after one hour of treatment. This is especially so when treatment is applied to the legs in a dependent position. The postural exercises are based to some extent upon the release of this histamine substance. The patient lies flat in bed with shoes and stockings removed. The room should be warm and draft-free. The legs are raised at the hips, the soles of the feet facing the ceiling and the position is maintained until the feet blanch, usually one or two minutes. This blanching is due to the withdrawal of blood and the lack of blood causes the tissues to release the histamine substance. The patient then sits up and hangs the legs over the edge of the bed for one to two minutes. Blood rushes in filling the dilated capillaries and arterioles. The patient then lies flat in bed from one to two minutes, with the legs covered. These exercises may be repeated many times daily. There may be individual variations in timing. The release of the histamine-like substance is the cause of the marked redness seen in many of these cases when the legs are in a dependent position. Besides the favorable action of this chemical, the postural exercises empty the legs of blood, filling them when they are lowered. Thus there is a constant interchange of blood.

The oscillating bed has the same effect as the exercises. The bed may be used for long periods of time without discomfort to the patient. It also is advantageous in cardiac, senile or arthritic cases where the exercises cannot be performed. Its main disadvantage is that the calf muscles tend to atrophy from disuse with a subsequent diminution in circulation.

The alternate suction-pressure apparatus is not of marked clinical value. The enthusiasm and promise with which it was originally used have not been sustained. Theoretically it is an ideal machine, but practically it falls far short of expectations. The affected limb is placed in a glass boot and the air alternately rarefied and increased above normal. Theoretically, during this suction phase, the reduced atmospheric pressure dilates the vessels. Aided by the reduced pressure, the blood readily pours into this enlarged vascular bed. During the pressure phase it is forced out, and a constant supply of fresh blood is thus brought about. Actually this apparatus is of little value because not enough suction can be applied forcefully to pull open spastic vessels. When enough suction is applied, it usually is excessive, and capillary hemorrhages result. However, it is of value in cases of spasm due to emboli or to Raynaud's disease.

Frequently a combination of methods is

used at one time and in one course of treatment. Diathermy often is combined with intermittent venous occlusion. The infra-red lamp applied to some other part of the body also is frequently used in association with other treatment. All methods of treatment may be used in the therapy of one case. Besides local treatment, general building up of the patient is desirable. This is accomplished by body massage and ultraviolet therapy. However, there should be no local manipulation or application.

From time to time other modalities and methods may be brought to one's attention. These include the use of the sinusoidal current, alternating suction-pressure applied with a thigh chamber and the immersion of the affected extremity in warm melted paraffin for the action of the heat. Usually these all are of limited scope. The successful treatment of a case depends upon the proper understanding of what changes are being brought about by treatment and the reasons for the dangers involved. Furthermore, much can be accomplished if one treats these diseased limbs as if they were made of fine porcelain.

Obstetrical Paralysis

Robert Lee Patterson, Jr., M. D.

This article on Erb's Palsy is intended to point out some reasons for the failure of conservative treatment which makes operations necessary and also to discuss the various operations as to their indications, principles and results.

It is well known that if these cases are properly treated early in life and are carefully trained and worked with, operations seldom are necessary later. The general opinion today may be summarized in Krieda's words: "In looking over a large series of cases I am impressed with the extraordinarily good prognosis of these cases. If the patients are trained early and sufficiently long by the familiar abduction and external rotation splint . . . the percentage of those which result in eventual deformity of an operative type is small indeed."[1] Our figures at the Hospital for the Ruptured and Crippled prove this statement. From 1928 to 1939, 491 cases of obstetrical paralysis entered our outpatient clinics. During the same period of time only 44 cases were admitted to the hospital for operation. Nevertheless, we constantly see cases which, in spite of treatment, show marked deformity or no return of function. These unfortunate results may be due to the following:

(1) The severity of the original nerve tear, such as avulsion of the nerve roots, producing the whole-arm type of paralysis. Many of these cases are hopeless from the beginning.

(2) Failure of parents to appreciate the necessity for frequent treatments or their inability to bring the cases in to the clinics. For instance, in 1937 there were 19 new cases seen in our clinic and after one year only 4 were still under active treatment. No social service can combat the indifference of patients in New York, nor can these patients even be found, because of their moving from place to place two or even three times a year.

(3) Failure of parents to carry out the exercises at home. In private practice it is possible to show the mother the technique of the exercises, have her supervise them at home, and report to the physician or physical therapist once a week or once every two weeks. But as a rule this program is unsuccessful in clinic cases because of finance, overwork, crowded living quarters and lack of understanding. During the first two to four years of life the children should be seen at least twice a week by a physical therapist and once a month by a physician.

(4) Failure to x-ray and discover possible bony changes such as epiphyseal displacement

135 East 65th Street, New York, N. Y.
Hospital for Ruptured and Crippled, New York City.
Read before the American Physiotherapy Association Convention in New York City, June 27, 1940, as part of the "Symposium on Erb's Palsy."

or bony blocks which interfere with exercises. These factors are what make most surgery necessary in the treatment of Erb's palsy.

Tears or damage to the brachial plexus may occur at the exit of the nerve roots or in the distal nerve trunks. They may be temporary or permanent and they may affect not only the nerves but the epiphysis or bony structures making up the joint as well. When there is a simple arm lesion, proper treatment usually leads to good results while neglected cases may require operation. When there is an involvement of the whole arm, the prognosis becomes increasingly difficult and operation often is necessary. Even when operation is resorted to, the prognosis still is uncertain since each case is different and the ultimate results will vary.

Since 1900 many operations have been devised to relieve this pitiful condition and to improve function and appearance. With the exception of the exploration of the brachial plexus these operations are not performed until the patient is from three to five years of age. There are three types of surgical intervention: (1) exploration and attempted repair of the damaged brachial plexus, (2) correction of existing deformity and (3) reinforcement of weak or paralyzed muscles by the use of tendon or muscle transplants. Often the second type is used as a preliminary step to the third.

The exploration of the brachial plexus is an extremely serious and difficult procedure and in the minds of many authors definitely is contraindicated. Campbell[2] states that it is rarely justified. According to him, exploration of the nerves can be performed when an operation is undertaken to correct deformity. The factors which cause us to hesitate to indorse exploration for all cases are the following:

(1) The procedure is an extremely difficult one in a small baby.

(2) The location of the damage cannot always be found, especially when the injury has been great. When a tear is present at Erb's point (that is, the junction of the fifth and sixth cervical roots at the deviation of the suprascapular nerve), repair is fairly easy. However, the tear of the nerve often cannot be found and repair, therefore, is impossible. Sharpe[3] states that he failed to find the lesion in only one case out of 54, but this is not the average. Ford[4] remarks that when the paralysis is severe it usually is due to avulsion of the roots from the cord and that in these cases operation rarely has proved to be beneficial.

(3) The mortality must be taken into consideration since in Taylor's[5] 94 cases four per cent died.

(4) It is very difficult to obtain the parents' permission to perform this operation, since an excellent prognosis cannot always be given and since a few weeks after onset they often notice some improvement in the function of the muscles of the hand or forearm. Parents cannot realize that in the whole-arm type, function may return in the hand and forearm yet not in the upper arm. Taylor's cases, operated on up to four years of age, showed some improvement in 50 per cent and an excellent result in 25 per cent. In view of the fact that only the severe cases were chosen, these results are good.

(5) Exploration does not eliminate the use of a brace and of physical therapy. The patient is required to wear a splint for several months after the operation.

(6) Regeneration of nerves does occur in Erb's Palsy with definite return of function and, therefore, it is safe to postpone the operation and to try conservative treatment as a general routine.

(7) The suturing of nerve ends, according to Taylor, gives essentially as good results if performed two or three years after injury as after a month or so. Hence waiting a reasonable length of time for recovery does not alter the ultimate result and can be recommended.

We can summarize our opinion regarding operations on the plexus by saying that they are justified for the child who has shown no definite improvement in spite of treatment over a period of four to twelve months. They are especially justified for cases with whole-arm involvement who fail to improve after four months.

Many cases of obstetrical paralysis, when first seen by the orthopedic surgeon, show secondary changes in the shoulder joint, the elbow or the forearm, or in the various muscles of the arm. These changes result mostly from neglect, from poor treatment or, surprisingly enough, occasionally from over-treatment. Surgical intervention often becomes necessary to relieve some of these deformities in order that physical therapy and conservative treatment can be carried out.

The secondary changes which are commonly

found are: (1) Bony changes or subluxation or both at the shoulder joint (that is, hooked acromial process, projected coracoid process, displaced upper humeral epiphysis, shallow glenoidal neck, etc.). (2) Contractures of the pectoralis major, the subscapularis, the flexors of the elbow, the pronators of the forearm, the flexors of the wrist and fingers, and the adductors of the wrist. (3) Bony changes about the elbow (that is, dislocation of the radial head, subluxation of the ulna, etc.).

The secondary changes in the elbow are difficult to understand and hard to treat except in a prophylactic way. Narrowing of the humero-ulnar joint, tightness of the capsule and elbow flexors anteriorly, and subluxation or dislocation of the radial head are the usual findings. We believe that loss of motion occurs under the following conditions: (1) When the paralyzed arm is allowed to hang at the side with the shoulder in abduction and the arm in internal rotation, causing the flexed position. (2) When the pronators of the forearm become contracted. (3) When bony changes occur as a result of direct injury at the time of birth. (4) When the elbow is splinted for too long a period. (5) When the splint is applied too tightly, causing, during the first few weeks, persistent edema about the elbow and resulting in permanent soft-part damage.

Secondary changes about the wrist usually produce a deformity of adduction and pronation with flexion contractures of the fingers. Partial volar subluxation in the extreme cases does occur and in the whole-arm type, motion of the fingers may be absent or present in distal joints only. Often the proximal phalanges are hyperextended and the distal ones flexed due to a paralysis of the interossei or lumbrical muscles.

By far the most common and useful procedure that has been employed in obstetrical paralysis is the Sever operation—a release of the tight or contracted internal rotators and adductors of the humerus. Sever[6] recommends section of the pectoralis major, the subscapularis outside the joint capsule, and, if necessary, muscular attachment into the coracoid process of the scapula. Out of 44 operations at the Hospital for the Ruptured and Crippled, only 13 required the complete procedure. In the others simple section of the pectoralis major and subscapularis tendons was found to be sufficient. Occasionally, osteotomy of the acromion is also used, if it acts as a block.

The Sever operation is best used (1) when there is no subluxation or posterior torsion, (2) when there is marked soft part deformity limiting passive motion, (3) when power can be detected in the external rotators and abductors.

When the case has been properly selected with the above points in mind, and proper postoperative after-care has been given, results from the Sever operation have been good and under such conditions the operation can be recommended. It adds nothing to the power of the arm but in general it improves its usefulness and appearance. The latter factor is especially important for girls. Steindler[7] reports good results in 85 per cent of a small group of cases.

The functional result of the Sever operation will depend largely on the type of after-care given. Splinting by plaster for two weeks is obligatory, after which time the plaster may be cut to permit physical therapy treatment. Radiant heat followed by gentle massage decreases the soreness and makes the patient more comfortable; older patients often notice considerable discomfort following such a radical change of position of the arm. However, active motion is encouraged and gentle stretching in external rotation and abduction is started. All splinting should be removed at the earliest possible date, usually about three months postoperatively. One must not be disappointed to find, in many of these cases, stiffness and limitation of rotations, especially internal rotation in the shoulder, for as long as a year following the operation. With proper physical therapy and usage this motion gradually will return. The lack of full rotation of the scapula, according to Sever, has not been explained, but its only importance is cosmetic.

For many years, especially in Europe, osteotomy of the humerus frequently was employed in attempting to overcome the internal rotation and adduction deformity. The most common names associated with this type of surgery have been Lange, Vulpius, Hoffa, Putti and Rogers. It is an operation which in general fails to improve function but aids appearance remarkably and is best suited to the patient without subluxation or torsion. Putti and Scaglietti,[8] in their work on "The Obstetrical Shoulder Trauma," have attempted to show that this deformity is usually the result of an epiphyseal fracture or dislocation, occurring at the time of birth and often not

showing up until later. Out of 98 cases followed, 62 were of this type and 22 were due to nerve injury. Putti and Scaglietti state that if the epiphysis is not displaced an almost complete cure can be expected, without any involvement of the joint. The importance of frequent x-rays should thus be stressed. It is surprising to see how few cases were x-rayed in the past. When the epiphysis is displaced and bony deformity results, the application of a plaster jacket with the arm in the correct position is advised. Within a month or so, a removal brace may be given and physical therapy, consisting of baking, massage and exercises, may be begun. This treatment is continued for two years, at which time a Sever procedure is performed. This allows the head to be in the correct position in relation to the glenoid and helps to prevent a recurrence of the posterior dislocation. At about eight weeks or so an osteotomy of the Putti type is recommended for those cases in which retroversion of the epiphysis originally was present.

The average osteotomy is performed through an incision about two inches below the shoulder joint. The lower fragment is rotated about 90 degrees and a plaster spica is applied. After eight weeks the plaster is removed and, if x-rays show good healing, massage and active exercises are begun.

For many years various surgeons have attempted to find some way of reinforcing a weak or paralyzed deltoid. No one completely reliable method has yet been discovered. Bradford,[9] Mayer,[10] Hoffa,[11] Hildenbrandt,[12] Lange,[13] Spitzy,[14] and Tubby,[15] have transplanted the trapezius or pectoralis major muscles. Ober[16] and Payr[17] used the triceps or biceps, Riedel[18] and L'Episcopo,[19] the teres major and latissimus dorsi, and Kleinberg,[20] the reattachment of the capsule. Nerve transplants for paralysis of the circumflex nerve have not been very successful. Each operation has been designed for a certain purpose and under certain existing conditions. For instance, for the Mayer transplant of the trapezius into the shaft of the humerus, good muscle power must be present in the trapezius, the serratus magnus and either the pectoralis major or the coracobrachialis, and there must be no subluxation. For the Ober transplant, the long head of the triceps and the short head of the biceps must be good and there must be no soft-part contractures to limit abduction.

The results in any of these transplants depend not only on the skill of the operator and his experience but also on the selection of the case for operation and on the cooperation of the patient. The after-care is tedious and long. Mayer states that he keeps his cases in plaster for at least six months and under careful supervision and training for over a year. Out of his 25 cases, 13 were classified as good (abduction to between 120 and 150 degrees), 5 as poor (between 75 and 120 degrees) and 7 as failures. All the latter cases required arthrodesis of the shoulder.

The use of physical therapy after any transplantation cannot be overemphasized, since the whole functional result depends on the after-care, assuming that the operation was well performed. In the average case the stitches are removed about 8 to 10 days after the operation. After about 18 days, treatments should be begun. With the patient lying face upwards on a hard, smooth table, the splint or brace is removed. This position will reduce tension on the transplanted muscle by eliminating gravity and the weight of the arm. At no time for a period of six weeks should the arm be allowed to hang at the side. Radiant heat and superficial massage, followed by passive movement of the extremity through a full range of external rotation and abduction are then begun. This is kept up four times a week for four to six weeks. After six weeks, active motions are started and only after the patient has active elevation while lying on the table is he allowed to sit up without some form of support. For the next three months the splint or brace is worn at night.

When there are no muscles which can be transplanted or when doubt is felt regarding the outcome if the muscles are transplanted, arthrodesis of the shoulder joint is recommended. Steindler states that it is the "preferable treatment at present" and Mayer remarks that it is the only "standard procedure" we have. There are, however, many objections to it. It is difficult to perform in young children, its cosmetic result is not pleasing and it limits motion about 50 per cent. In none of the 44 cases admitted to the Hospital for the Ruptured and Crippled was this procedure done. When there is usable power in the elbow and hand, this operation is functionally beneficial, but when the rhomboids, serratus magnus and pectoralis minor are paralyzed, it is not successful.

So far I have spoken only of the common procedures on the upper arm but we must not fail also to mention operative procedures on the forearm, wrist and hand. Nothing is more discouraging to a patient than to see daily improvement in the function of the shoulder and upper arm and yet to be unable to use the forearm, hand or fingers. Fortunately, the lower-arm type of paralysis is not common. Ford reports only five cases out of 200 examined. Any surgery performed upon the elbow and forearm is aimed to increase supination and flexion of the elbow, dorsiflexion of the wrist or extension of the fingers. A release of the pronator radii teres often is helpful. A wrist fusion in slight dorsiflexion with a transplant of the flexor carpi ulnaris and radialis into the finger extensors and thumb abductors may give a good functioning hand. In the cases studied the Steindler transplant of the origin of the wrist flexors upward on the humerus was not used, but it is an excellent procedure.

In conclusion, let me reiterate, in the words of Sever, that operative procedure for obstetrical paralysis is, at best, only a "patchwork."

BIBLIOGRAPHY

1. Krieda, A.: In Discussion of Kleinberg's paper, J. A. M. A. 98:294, 1932.
2. Campbell, W.: Operative Orthopedics, C. V. Mosby, St. Louis, 1939.
3. Sharpe, W.: The Operative Treatment of Brachial Plexus Paralysis, J. A. M. A., 66:876, March 18, 1916.
4. Ford, F. R.: Diseases of the Nervous System in Infancy and Childhood, Thomas, Baltimore, 1937.
5. Taylor, A. S.: Lewis Practice of Surgery, Vol. III, Ch. 7, 1929.
6. Sever, J. W.: Obstetrical Palsy, J. Ortho. Surg. 14: 456, 1916.
7. Steindler, A.: Operative Orthopedics, D. Appleton & Co., New York, 1925.
8. Scaglietti, O.: Lesions ostetriche della spalla. Chir. d. org. di Movimento, 22:183, 1936, and The Obstetrical Shoulder Trauma, Surg., Gynec. and Obst., 66:868, 1938.
9. Bradford, E. H.: The Operative Treatment of Paralysis of the Shoulder following Ant. Polio, Am. J. Ortho. Surg., 8:21, 1910.
10. Mayer, L.: Transplant of the Trapezius for Paralysis of the Abductors of the Arm, J. Bone and Joint Surg., 9:412, July, 1927, and Operative Reconstruction of Paralyzed Upper Extremity, J. Bone and Joint Surg., 21:380, April 1939.
11. Hoffa, A.: Endresultate in Sehnenoperationen, Arch. f. klin. Chir., 81:1, 1906.
12. Hildebrandt, A.: Uber eine neue Methode der Muskeltransplantation. Arch. f. Klin. Chir., 78:75, 1906.
13. Lange, F.: From Mayer, J. Bone and Joint Surg., 21:380, April 1939.
14. Spitzy, Zeitschr. f. Ortho. Chir., 30:22.
15. Tubby, A. A.: Deformities and Diseases of the Bones and Joints. Macmillan, 1912.
16. Ober, F. R.: J. A. M. A., 99:2182, Dec. 24, 1932.
17. Payr, E.: Arch. f. klin. Chir., 106:235, 1914.
18. Riedel, G.: Zur frage der Muskeltransplantation bei deltoides Lahmung, Ergebn. d. Chir. du Ortho., 21:489, 1928.
19. L'Episcopo, J. B.: Restoration of Muscle Balance in the Treatment of Obstetrical Paralysis, N. Y. State J. of Med., 39:357, 1939.
20. Kleinberg, S.: Reattachment of Capsule and External Rotators of the Shoulder for Obstetrical Paralysis, J. A. M. A., 98:294, 1932.

Training of Physical Therapy Technicians

During the past fifteen years there has been a belated but gratifying growth in appreciation of the varied beneficial influences of physical therapy. Strange that one of the oldest therapeutic fields known to mankind should have waited so long to be recognized with other major factors of the medical armamentarium. As far as extension of physical therapy to the public is concerned, however, for rich and poor alike the surface has been hardly more than scratched.

In his recent address before the thirty-sixth Annual Congress on Medical Education and Licensure in Chicago, Gregg[1] remarked:

> A curious phenomenon in American medicine is the deft elimination of much reference to physical therapy. Almost as those who keep their children ignorant of the facts of life, we appear to protect the American medical student from the knowledge of physical therapy, mindful, I suppose, of the abuses imputed to osteopaths and chiropractors. . . . But the effects of heat on capillary circulation, lymph flow and inflammation, and the indications and effects of massage and passive movement or of irradiation, can certainly be learned and taught as physiology without any trace of charlatanry. The current unabashed ignorance of physical therapy in this country leaves it as an excellent opportunity for development in American medicine.

These remarks are a deserved exposé of a situation which lamentably needs correction. The cults owe their origin largely, if not entirely, to the inertia and apathy with which the medical profession has regarded physical therapy. Fortunately this situation is being slowly but definitely bettered by virtue of the educational campaign now under way. Physical therapy is included officially in the curriculums of some of the leading medical schools. It has received attention and some emphasis in many others. The field constitutes a definite specialty, however, and one of the difficulties as well as one of the oppor-

Reprinted from J. A. M. A., 114:26:2554, June 29, 1940.

tunities is the necessity of training men in this field.

In many medical centers and in many smaller communities, physicians are gradually becoming aware of the importance of applying the various measures included under physical therapy to a host of conditions. Intellectual appreciation of the therapeutic potential in this field and actual practice of its precepts are, however, two different matters. Even if the general practitioner should be equipped to carry out skilfully the various measures of physical therapy, he could himself reach only a negligible fraction of those patients, both medical and surgical, who desperately need such care. This need can be met in a large way only by physical therapy technicians trained to use with skill and restraint those complicated measures which constitute the essential basis of physical therapy, namely, heat, effleurage, massage, postural exercises, passive motion and active exercise. Fortunately the training of persons educationally qualified to enter this field, such as registered nurses or graduates in physical education, can be achieved in a relatively short time. Such qualifications do not supply that experience and skill which only time will yield, but at least they afford a direct and immediate avenue of approach to the application of physical measures. Indeed, the opportunity today for agreeable and remunerative effort, of great sociologic value, is such that young persons interested in activities within the field of medicine could well consider this vocation. Educational opportunities for training are, as indicated in a recent issue of THE JOURNAL,[2] as yet limited; but they are in process of being expanded and as the demand increases further expansion can be expected.

Direction of the activities of physical therapy technicians by qualified medical supervision is primarily important. Such qualified direction is available in only a few medical centers. Until this requirement has been filled, the medical profession and the public will be fortunate if the quota of technicians needed for a host of patients can be supplied.

The Council on Physical Therapy has often pointed out that the basis of the principles and practice of physical therapy consists in the application of heat, massage and exercise. It is still necessary to disabuse the medical mind from the thought that the field is constituted by physical apparatus. Except for refinement of application, relatively little that is new has been added, in principle, to physical therapy since the days of Hippocrates apart from the influence of the x-rays and radium. These agencies are by definition restricted to elaborate physical equipment directed by medical minds trained in these lines of effort.

Orthopedists have long since learned the value of physical therapy. Neurologists, following the lead of Weir Mitchell, now make use of this measure in a large way. Internists as a group and practitioners in general have small interest in the field and perhaps even less familiarity with it. Thousands of cases of fracture in or near joints and a vastly greater number of sufferers from arthritis are daily experiencing sharply limited motion and permanent ankylosis because of well intentioned ignorance and because of a dearth of personnel qualified to bring critically to bear even the simplest physical therapeutic measures. Precisely here many more persons adequately trained in the practice of physical therapy are needed. In respect to the more subtle practices in difficult cases the number of experienced persons is hopelessly inadequate.

---

1. Gregg, Alan: Addenda to the Agenda for the Decade 1940-1950, J. A. M. A. 114:1139 (March 30) 1940.
2. Schools for Physical Therapy Technicians, J. A. M. A. 114:1262 (March 30) 1940.

OFFICERS—1940-1942

Dorothy Young, Vice-President

Betty Rice, Vice-President

Catherine Worthingham, President

Evelyn Anderson, Secretary

Catherine Wallace, Treasurer

The Physiotherapy Review

Editor-in-Chief: MILDRED ELSON

Business Manager: HAZEL PUTMAN

Associate Editors

GERTRUDE BEARD

JESSIE STEVENSON

BESS SEARLS

The Physiotherapy Review is published bimonthly by The American Physiotherapy Association

Editorial and Business Office, 737 N. Michigan Ave., Chicago

VOL. 20 *September-October* NO. 5

Last June the approved schools of physical therapy graduated about one hundred and fifty students. This number may be small as compared to other professional groups, but each one is of extremely high caliber, since they have been carefully selected for training from a larger number of applicants. The schools have carefully taught these students not only in the art of physical therapy but in the ethics and ideals of the profession. They are full of enthusiasm for the work they are to do and the services they hope to render. "The administration of therapy is an art as well as a science; it is a profession, not a trade. In its application the heart should be used as much as the head and hands. It is the duty of the physician and his colleagues to 'cure' and to be kind and true to his patients. If he cannot 'cure,' he can at least be kind and true. We can be sympathetic and at the same time scientific. We can smile and also manifest that gentle firmness that so frequently is necessary. It is easy to be cross and impatient when we are tired and indisposed and pressed by an ungrateful patient. Here again great courage is required to manifest that humor, honor and humanity which are essential for success in the Healing Art."*

Because of the new system of accepting the students at their graduation a larger than usual proportion of these graduates have now become "provisional" members of the American Physiotherapy Association. They form the nucleus for the future of our Association, and it is the responsibility of every member and of the chapters, therefore, not only to welcome them but by word and deed to help them maintain the ideals taught them. These new members could take part in chapter activities. Their opinions should be solicited in discussions, and because they are new and young they might otherwise be reluctant to take part in such discussions. They should be aware of the fact that local and sectional problems do exist but that in attempting to solve these problems the best interests of the Association as a whole should be given due consideration and thereby the advancement of the profession. They should be urged to attend local, sectional and national meetings in order that they may become familiar with and help to solve the problems of the organization. They should be given the opportunity to serve on committees in order that they may learn about and understand the "machinery" of the Association, for out of this younger group come our future officers and directors.

The present high esteem which we enjoy is due to faithful service to our patients and physicians. Throughout the world there are too many demands of: "We must have this—or else." In unity there is strength, but let it be the unity of service in a profession.

*Ivy, A. C., Ph. D., M. D.: The Essentials for Success in Therapy, Physio. Review, Sept.-Oct. 1940.

Ohio Chapter

M. Katharine Lorrilliero, a member of the Ohio Chapter, died on August 30, 1940, in Athens, Greece, where she has been director of the center for crippled children of the Near East Foundation since December 1937. Prior to that time Miss Lorrilliero was employed at the Association for the Crippled and Disabled in Cleveland.

Annie Hodgson, also a member of the Ohio Chapter, has taken a leave of absence from her duties at the Children's Hospital in Cincinnati and has returned to her home in England.

S. California

Miss Geraldine Baker, a member of the Southern California Chapter, was united in marriage on June 1, 1940, to Mr. Elmer L. Cawby of Los Angeles.

Mississippi Valley Medical Society

The Sixth Annual Meeting of the Mississippi Valley Medical Society will be held at the Hotel Fort Armstrong, Rock Island, Illinois, September 25, 26 and 27, 1940.

Correction

In the article entitled "Anatomical and Mechanical Considerations of the Knee Joint" by George T. Aitken, M. D., which appeared in the July-August 1940 issue of the Review, Figure 3 has been printed upside down. Also No. 4 in the bibliography should read "Journal of Bone and Joint Surgery, Volume 10, January 1928."

National Society for Crippled Children

The annual convention of the National Society for Crippled Children will be held at Hotel Battery Park in Asheville, North Carolina, October 5 to 10, 1940. The program includes (1) services involved in the orthopedic care and treatment of crippled children; (2) coordinating lay and professional services in the orthopedic care and treatment of crippled children; (3) the crippled child, his education, social and economic adjustment, and (4) coordinating lay and professional services in the field of education, social and economic adjustment.

Egyptian Building

On January 16, 1940, the Medical College of Virginia at Richmond, Virginia, rededicated the restored historic Egyptian Building. The auditorium of the building has been named The Simon Baruch Auditorium, and a tablet in the foyer of the building reads as follows: "After nearly a century usefully given to education for health service, this building has been reconstructed within and restored without. Its auditorium is dedicated to the memory of a distinguished alumnus, Dr. Simon Baruch, 1840-1921, a member of the class of 1862 who was a Confederate surgeon, a creative practitioner, investigator and father of American hydrotherapy. The generosity of a devoted son, Bernard M. Baruch, is gratefully acknowledged by the college in this timely restoration."

This is the only building in the United States dedicated to a physician who specialized in physical therapy.

Index to Current Literature

Apparatus

A Simple Device for Forced Flexion of the Knee. EARL C. ELKINS, M.D. Arch. P. T., Aug. 1940.

A Useful Power Output of Short Wave Diathermy Apparatus: A Determination of the Actual Power Absorbed by a Patient. E. MITTELMANN and H. J. HOLMQUEST. Northwestern Univ. Med. School Quarterly Bulletin, Fall Quarter, 1940.

Toronto Splints: How Splints Are Used to Maintain Proper Position in the Paralytic Stage of Poliomyelitis. MARY E. CHURCH. The Crippled Child, August 1940.

Electro-Medical Apparatus. Part II, No. 19, continued. L. G. H. SARSFIELD, D.Sc. Brit. J. Phys. Med., July 1940.

Arthritis and Rheumatism

Physical Therapy in Arthritis with Special Reference to Home Treatment. FRANK H. KRUSEN, M.D. J.A.M.A., Aug. 24, 1940.

The Use of Plaster Splintage in the Treatment of Arthritis. G. O. TIPPETT, Brit. J. Rheum., April 1940.

Physical Treatment in Arthritis. J. CHART. Soc. M. and M. Gym., Aug. 1940.

The Use of Histamine in Rheumatoid Arthritis. R. O. MUETHER, M.D. Annals of Int. Med., May 1940.

Present Trends in the Study of Arthritis and Rheumatism. RUSSELL L. CECIL, M.D. Minn. Med., Aug. 1940.

DIATHERMY IN ARTHRITIS. EDWARD J. BURNETT, M.D. Med. Bull. Vets. Adm., July 1940.

Bone and Joint Injuries and Diseases

Two Cases of Bilateral Congenital Dislocation of the Head of the Radius. H. PAGE MAUCK, M.D., and R. D. BUTTERWORTH, M.D. J.A.M.A., June 29, 1940.

Unusual Migration of Joint Mouse in a Case of Osteochondritis Dissecans of the Knee. ISADORE ZADEK, M.D. Bull. Hosp. for Joint Dis., July 1940.

The Significance of the Polymorphonuclear Leukocyte Toxic Index in Affections of the Musculo-Skeletal System. CHARLES J. SUTRO, M.D. Bull. Hosp. for Joint Dis., July 1940.

Tuberculosis of Bones and Joints in Children. GEORG WOLFSOHN. Med. Record, March 20, 1940.

Cancer

Experimental Hibernation of Metastatic Growths. ARKELL M. BAUGHN, M.D. J.A.M.A., June 8, 1940.

On the Effect of Light Upon the Incidence of Tumours in Painted Mice. I. DONIACH and J. C. MOTTRAM. Amer. J. Cancer, June 1940.

Convalescent Care

Institutional Convalescent Care for Surgical Patients. I. S. RAVDIN, M.D. New York State J. Med., April 1, 1940.

Convalescent Care—Perpetual Challenge. E. H. L. CORWIN. New York State J. Med., April 1, 1940.

The Problem of the Convalescent Patient. E. M. BLUESTONE, M.D. Modern Hosp., June 1940.

Dermatology

Keratosis Blennorrhagica. A Brief Review and Report on the Effects of Hyperpyrexia in its Treatment. FRANK C. COMBES, M.D., CARLISLE DIETRICH, M.D., and JULIUS COHEN, M.D. J. A. M. A., May 25, 1940.

Finsen Light Therapy in Lupus Vulgaris. Abst. in J. A. M. A., June 8, 1940, from Strahlentherapie, Jan. 31, 1940.

Hypertherm Treatment of Cutaneous Diseases. ELMORE B. TAUBER, M.D., and LEON GOLDMAN, M.D. Arch. Derm. and Syphil., May 1940.

Passive Transfer of Light Sensitivity. J. LAMAR CALLAWAY, M.D. Arch. Derm. and Syphil., May 1940.

Diathermy

Diathermy in Ophthalmology. A. D. RUEDEMANN, M.D., and W. J. ZEITER, M.D. Arch. P. T., Aug. 1940.

Short Wave Diathermy in Nasal Sinus Disease. FREDERICK L. WAHRER, M.D. Arch. P. T., July 1940.

Short Wave Therapy in Eye Diseases. FRANK W. LAW, M.A., M.D., Brit. J. Phys. Med., July 1940.

Observations on Short Wave Heat. A. BACHEM, Ph.D. Arch. P. T., April 1940.

Diathermy and Other Physical Methods for Syphilis. EDWARD C. TITUS. Med. Record, May 1, 1940.

Short Wave Diathermy. NATHANIEL H. BADAINES, M.D., and ELEANOR BARNARD. Med. Bull. Vets. Adm., July 1940.

Short Wave Diathermy in Neurosyphilis. PERCIVAL G. LASCHE, M.D. Med. Bull. Vets. Adm., July 1940.

Diathermy in Arthritis. EDWARD J. BURNETT, M.D. Med. Bull. Vets. Adm., July 1940.

An Improved Method of Applying Short-Wave Diathermy. F. K. NAGELSCHMIDT. Brit. J. Phys. Med., May 1940.

The Treatment of Nasal Sinus Infection by Ultra-Short Wave Diathermy. W. P. E. PATERSON, M.D. Canad. Med. Assoc. J., May 1940.

Exercise

Orthopedic Gymnastic Treatment of Spinal Abnormalities. HENRY G. HADLEY, M.D. Arch. P. T., Aug. 1940.

Remedial Exercises for the Foot. J. Chart. Soc. M. and M. Gym., July 1940.

The Effect of Exercise on the Volume of the Blood. NOLAN L. KALTREIDER and GEORGE R. MENESLY. J. Clinical Invest., July 1940.

Eye, Ear, Nose and Throat

Diathermy in Ophthalmology. A. D. RUEDEMANN, M.D., and W. J. ZEITER, M.D. Arch. P. T., Aug. 1940.

Roentgen Therapy in Otorhinology. MATTHEW S. ERSNER, M.D. Arch. P. T., Aug. 1940.

Short Wave Diathermy in Nasal Sinus Disease. FREDERICK L. WAHRER, M.D. Arch. P. T., July 1940.

Short Wave Therapy in Eye Diseases. FRANK W. LAW, M.D. Brit. J. Phys. Med., July 1940.

The Treatment of Nasal Sinus Infection by Ultra-Short Wave Diathermy. W. P. E. PATERSON, M.D. Canad. Med. Assoc. J., May 1940.

Cyclodiathermy Puncture in Cases of Glaucoma. PROF. DR. ALFRED VOGT. Brit. J. Ophthal., June 1940.

Vacuum Massage of the Eyeball. THEODORE J. DIMITRY, M.D. Arch. Ophthal., May 1940.

Ocular Manifestations in Hydroa Vacciniforme. WM. H. STOKES, M.D. Arch. Opthal., June 1940.

Fractures

Vertebral Fractures as a Complication of Convulsions. PHILLIP POLATIN, M.D., M. M. FRIEDMAN, M.D., M. M. HARRIS, M.D., and W. A. HORWITZ, M.D. J.A.M.A., Aug. 10, 1940.

Role of Physical Therapy in Fractures. M. E. KNAPP, M.D. Arch. P. T., July 1940.

Fractures of the Neck of the Femur in Childhood. JOHN C. WILSON, M.D. J. Bone and J. Surg., July 1940.

Fractures of the Tibial Plateau. GUY W. LEADBETTER, M.D., and FRANK M. HAND, M.D. J. Bone and J. Surg., July 1940.

Heat and Cold

Pathologic Changes Observed in Human Tissues Subjected to Subcritical Temperatures. LAWRENCE W. SMITH, M.D. Arch. Pathol., July 1940.

Experimental Hibernation of Metastatic Growths. ARKELL M. BAUGHN, M.D. J. A. M. A., June 8.

Hyperpyrexia

Gonorrhea: Its Treatment by Artificial Fever and by Fever Therapy in Combination with Sulfanilamide. ELMER BELT, M.D., and ALVIN W. FOLKENBERG, M.D. Calif. and West. Med., April 1940.

Keratosis Blennorrhagica: A Brief Review and Report on the Effects of Hyperpyrexia in its Treatment. FRANK C. COMBES, M.D., CARLISLE DIETRICH, M.D., and JULIUS COHEN, M.D. J. A. M. A., May 25, 1940.

Hypertherm Treatment of Cutaneous Diseases. ELMORE B. TAUBER, M.D., and LEON GOLDMAN, M.D. Arch. Derm. and Syphil., May 1940.

Artificial Fever Therapy. LELAND F. GLASER, M.D. J. Kan. Med. Soc., May 1940.

The Use of Intravenous Sodium Chloride in Pyrotherapy. ERIC E. ROSENBERG, M.D., and NORMAN N. EPSTEIN, M.D. Amer. J. Med. Sci., May 1940.

Acute General Paresis. M. HERMAN, M.D., and M. P. ROSENBLUM, M.D. Amer. J. Psychiat., May 1940.

Injuries

The Modern Treatment of Injuries. J. Chart. Soc. M. and M. Gym., Aug. 1940.

Restoration of Injured Hands. J. Chart. Soc. M. and M. Gym., Aug. 1940.

Localized Volkmann's Contracture. JOHN BRUCE. J. Bone and J. Surg., July 1940.

Low Frequency Currents

Esophageal Dysfunction Treated with Sinusoidal Current. M. J. MANDELBAUM, M.D. Arch. P. T., Aug. 1940.

Response and Increase in Skin Temperature as Indicators of Efficiency of Vasodilating Drugs by Iontophoresis. DAVID H. KLING, M.D. Arch. P. T., July 1940.

Combined Coagulation and Ionization of Cervical Erosions and Endocervicitis. DAVID DEROW, M.D. Arch. P. T., March 1940.

The Effect of the Interaction of Ions, Drugs and Electrical Stimulation as Indicated by the Contraction of Mammalian Unstriated Muscle. INDERJIT SINGH. J. Physiol., May 1940.

Miscellaneous

Low Back Pain. H. H. BOUCHER, M.D. Bull. Vancouver Med. Assoc., June 1940.

The Work Done by Muscles in Running. HERBERT ELFTMAN. Amer. J. Physiol., June 1, 1940.

Discogenetic Disease. ALBERT OPPENHEIMER, M. D. Amer. J. Surg., Mar. 1940.

Colonic Irrigation: Indications and Technic. WADE CLINE, M.D. Arch. P. T., Aug. 1940.

Periosteal Fibrosarcoma of Femur. MAURICE H. HERZMARK, M.D. Bull. Hosp. for Joint Dis., July 1940.

The Cooperation of the Health Service and Physical Education Department. D. F. SMILEY, M.D. Journal Lancet, July 1940.

Practical Implications of Strength-Duration Curves in Early Paralysis. FRED B. MOOR,, M.D., CLARENCE W. DAIL, M.D., and KENNETH KELLOGG, M.D. Arch. P. T., July 1940.

Present Status of the Hearing Aid Problem. HOWARD A. CARTER, B.S. in M.E. Arch. P. T., July 1940.

Congenital Flat-Foot. A New Surgical Approach. J. WARREN WHITE, M.D. J. Bone and J. Surg., July 1940.

Arthrodesis of the First Metatarsophalangeal Joint. FREDERICK R. THOMPSON, M.D., and ROBERT T. MCELVENNY, M.D. J. Bone and J. Surg., July 1940.

Oral and Medical Treatment of Gonorrhea in the Male. P. S. PELOUZE, M.D. J.A.M.A., May 11, 1940.

Nervous and Mental Injuries and Diseases

Epilepsy, Observations on Treatment. FREDERICK LEMERE, M.D. Northwest Med., Aug. 1940.

Vertebral Fractures as a Complication of Convulsions. PHILLIP POLATIN, M.D., M. M. FRIEDMAN, M.D., M. M. HARRIS, M.D., and W. A. HORWITZ, M.D. J.A.M.A., Aug. 10, 1940.

Multiple Sclerosis. Maine Med. Assoc. J., abst. in J.A.M.A., May 11, 1940.

Ultraviolet Irradiation as an Adjuvant to the Chemotherapy of Seroresistant Dementia Paralytica. DAVID L. LIBERMAN, M.D., and ISADORE SPARK, M.D. Med. Bull. Vets. Adm., July 1940.

Short Wave Diathermy in Neurosyphilis. PERCIVAL G. LASCHE, M.D. Med. Bull. Vets. Adm., July 1940.

Clinical Experience in Electrically Induced Convulsions. FRANCIS E. FOX. Brit. Med. J., May 18, 1940.

Acute General Paresis. M. HERMAN, M.D., and M. P. ROSENBLUM, M.D. Amer. J. Psychiat., May 1940.

Occupational Therapy

Play Therapy for Special Needs. ETHEL KAWIN. Modern Hosp., April 1940.

Occupational Therapy in Canada. J. Chart. Soc. M. and M. Gym., Aug. 1940.

Therapeutic Value of Recreation. ALFRED KAMM. Occup. Ther. and Rehabil., Aug. 1940.

Peripheral Vascular Diseases

The Effects of Cigarette Smoking and Deep Breathing on the Peripheral Vascular System. MICHAEL G. MULINOS, M.D., and ISRAEL SHULMAN, M.D. Amer. J. Med. Sci., May 1940.

A Study of the Adjustment of Peripheral Vascular Tone to the Requirements of the Regulation of Body Temperature. A. C. BURTON and R. M. TAYLOR. Amer. J. Physiol., June 1, 1940.

Physical Therapy

Physical Therapy in Arthritis with Special Reference to Home Treatment. FRANK H. KRUSEN, M.D. J.A.M.A., Aug. 24, 1940.

The Place of Physiotherapy in War Surgery. P. BAUWENS, M.R.C.S. J. Chart. Soc. M. and M. Gym., Aug. 1940.

The Need for Physiotherapy. J. Chart. Soc. M. and M. Gym., July 1940.

Respiratory Diseases and Conditions

Therapeutic Advances in Vasomotor Rhinitis and Bronchial Asthma. J. A. HAIMAN, M.D. Arch. P. T., Aug. 1940.

Diagnosis and Treatment of Bronchial Asthma. CHARLES H. EYERMANN, M.D. Dis. of the Chest, Aug. 1940.

Tuberculosis

Tuberculous Tracheobronchitis. ROBERT S. JENKS. Amer. Rev. Tuber., June 1940.

Tuberculosis of Bones and Joints in Children. GEORG WOLFSOHN. Med. Record, March 20, 1940.

Genital Tuberculosis. GILBERT J. THOMAS, M.D., T. L. STEBBINS, M.D., and FRANK J. RIGOS, M.D. Minn. Med., May 1940.

Ultraviolet Radiation

Actinic Studies and Results of Vaginal Irradiation in Diseases of Women and Hemorrhagic Conditions. A. F. LANDEKER, M.D. Med. Record, Feb. 21, 1940.

Ultraviolet Irradiation as an Adjuvant to the Chemotherapy of Seroresistant Dementia Paralytica. DAVID L. LIBERMAN, M.D., and ISADORE SPARK, M.D. Med. Bull. Vets. Adm., July 1940.

Finsen Light Therapy in Lupus Vulgaris. Abst. in J.A.M.A., June 8, 1940, from Strahlentherapie, Jan. 31, 1940.

ABSTRACTS

John S. Coulter, M.D.

Effect of Natural Carbonated Baths on Rate and Amplitude of Pulse and Blood Pressure

Samuel Dorrance, M.D., and Walter S. McClellan, M.D. Saratoga Springs, New York. In Arch. P. T., XXI:3:133, March 1940.

The authors conclude:

1. Observations of the pulse rate, pulse amplitude and blood pressure on 44 patients were made with the Tycos recording sphygmomanometer and 90 pairs of tracings were made before and after the natural carbon dioxide mineral water bath.

2. In 86 per cent of the observations there was a decrease in pulse rate which is the typical response to these baths.

3. The amplitude of the oscillations increased more frequently than it fell and this was more evident when arterial constriction was present, resulting in low amplitude of the oscillation. Also, the increase was more evident in the arm than in the leg.

4. The changes noted in systolic, diastolic and pulse pressures were not striking as the number showing increases were nearly the same as that which manifested decreases.

5. The amplitude of oscillations gives some evidence that the carbon dioxide bath, in addition to producing a peripheral capillary hyperemia, results in some dilatation of the smaller vessels of the arterial systems.

Hallux Valgus and Rigidus

F. G. Allan, F. R. C. S. In Brit. Med. J., No. 4135, Page 579, April 6, 1940.

In this condition the great toe is deflected at the metatarsophalangeal joint towards the second toe. This deviation rarely occurs alone but is accompanied by other changes in the foot—a widening of the fore part and often by a flattening of the longitudinal arch.

In early cases, or when the deformity is slight, an effort may be made to remedy the defect by conservative measures. The wearing of a night splint to hold the great toe straighter, the use of digitated stockings and the fitting of an insole with a toe post to hold the great toe separated from the second may be tried.

In a great number of cases operative treatment becomes necessary to restore comfort in walking and to make the easy fitting of normal shoes possible. The stitches are left in until the plaster case is removed, and after seven or eight days following the operation the patient is allowed to take full weight.

A shoe with a straight-sided inner border and fitted with a domed insole to support the anterior arch is next worn. Faradic foot baths and intrinsic muscle exercises are helpful in restoring full function. If the longitudinal arch was weak, the shoe is raised on its inner border one-sixth of an inch and flatfoot exercises are given as well.

Hallux rigidus occuring in adolescents may follow injury and appears to be a synovitis of the metatarsophalangeal joint with protective muscle spasm. Usually no change is seen radiographically, and the condition clears up with rest or with the wearing of a metatarsal bar behind the trend.

This is directed chiefly to restoring mobility, and in mild cases, and when operation is contraindicated or is inconvenient, manipulative treatment can be employed. The great toe is firmly grasped through a thin towel to prevent the fingers slipping, strong traction is exerted in its long axis and continued for a minute or so, then rotatory and lateral movements are begun in either direction and finally the toe is strongly dorsiflexed. This manipulation is repeated several times at one sitting and is given daily. The great toe joint is strapped with one-inch elastoplast after each treatment. The wearing of a metatarsal bar will be helpful in taking stress off the joint while movement is returning.

In most cases, however, operation will be preferred, and where rigidity arises from the blocking of movement by osteophytes and the rounded contour of the central part of the head is intact a trimming operation as described for hallux valgus may suffice.

Peripheral Vascular Disease: A Critical Survey of Its Conservative and Radical Treatment

Alton Ochsner, M. D., F. A. C. S., and Michael DeBakey, M. D., F. A. C. S., New Orleans, Louisiana. Surg., Gynec. and Obst., 70:6: 1058, June 1940.

Because peripheral vascular disease consists of diminution in blood supply to the extremities, therapeusis consists of measures aimed to improve the peripheral circulation and may be divided into two large groups: (1) conservative measures and (2) radical procedures. Generally, conservative measures are indicated in all cases of peripheral vascular disease except in the acute vascular catastrophes and in the rapidly progressive peripheral vascular disturbances. In those instances, however, in which the conservative measures fail, more radical measures may become necessary. The conservative measures consist largely of two groups: (1) those which are directed toward the elimination of all factors which increase vasospasm and (2) those factors which produce vasodilatation.

The vasospastic factors which are of importance are: (1) emotional disturbances, (2) environment and (3) tobacco. These factors are particularly important in those peripheral vascular diseases associated with a predominance of vasospasm—namely, the vasospastic functional disease and the vasospastic organic disease—and of less importance in those conditions in which there is little or no vasospasm, such as degenerative organic disease.

In addition to the elimination of the vasospastic factors, which as just mentioned is all important, in many instances it is desirable to produce vasodilatation which may be done in one of the following different ways: (1) application of heat, (2) drugs and (3) vascular exercises. It is well known that the application of heat to a part will produce normally an increased vascularity. Because of the diminished blood supply to an extremity in a peripheral vascular disease and the resultant inability to carry away an excessive amount of heat applied to such an extremity, the application of heat to the involved extremity is not without danger and should not be used at all or with extreme caution. The application of heat to the involved extremity is not necessary because, as shown by Lewis and Pickering, and emphasized by Gibbon and Landis, application of heat to a localized portion of the body produces a generalized vasodilatation. Thus, equally as good results can be obtained by the application of heat to an uninvolved extremity without the danger of injury to the involved extremity by the heat applied directly to it. A patient with vascular disease of the lower extremity should immerse his hands and arms for 20 to 30 minutes, two to three times a day and, similarly, a patient with a peripheral vascular disease that involves the upper extremity and is associated with vasospasm should immerse the lower part of the body in hot water for 20 to 30 minutes, two or three times a day.

Vascular exercises are of value in some cases of peripheral vascular disease. Buerger originally described the exercises known by his name and found that when systematically used they were of distinct benefit in the promotion of collateral development. Probably of more value than the Buerger exercises are those exercises obtained by means of a tilting bed. This is particularly true in patients who have progressive lesions and who are confined to bed. Passive vascular exercises by mechanical devices have been used extensively in the treatment of peripheral vascular disease. This form of therapy probably is of greatest relative value in those patients with degenerative organic disease because they have little or no associated spasm. Veal has shown, however, that in those instances in which this method of therapy may be beneficial in patients with extensive collateral circulation, it is of little or no value in those patients who have marked diminution of the vascular bed. Obviously the method has distinct limitations because these patients are in greater need of circulatory improvement. Kountz found that little benefit is derived from the use of this machine and deTakats and Veal believe that the degree of involvement present at the onset of treatment is the most important factor in the determination of the degree of benefit which may be obtained by this form of therapy.

Based upon the original observations of Bier, Moszkowicz and Matas, and the extensive studies of Lewis and his coworkers on the principles of reactive hyperemia, intermittent venous occlusion has been developed as a simpler and less expensive method of therapy than passive vascular exercises. Here again the limitations of this form of therapy are much the same as for the passive vascular exercises. DeTakats found that it had no beneficial influence on pure vasospastic functional disturbances and its limited value also has been indicated by others.

The Problem of Rheumatism and Arthritis: Review of American and English Literature (Sixth Rheumatism Review)

Philip S. Hench, M. D., F. A. C. P., Rochester, Minn.; Walter Bauer, M. D., F. A. C. P., Boston; M. Henry Dawson, M. D., New York; Francis Hall, M. D., F. A. C. P., Boston; W. Paul Holbrook, M. D., F. A. C. P., Tucson; J. Albert Key, M. D., St. Louis; Currier McEwen, M. D., F. A. C. P., New York. Annals Int. Med., Vol. 13, No. 9, March 1940.

Tennis Elbow. Conservative treatment was recommended for early acute cases: rest, heat, the arm in a sling or immobilized in a suitable splint. Massage and motion make the condition worse. Many patients recover spontaneously. If the condition becomes chronic most patients can be cured, according to West and North, by one manipulation under anesthesia after the method of Mills (1928): full flexion of the wrist with full pronation of the forearm, the elbow then being brought into full extension. West found the method of Cyriax generally unsuccessful. If manipulation is not accepted, the application of a cock-up splint for a month may be required. Strapping gives tardy relief; prolonged rest of the part is not acceptable to most victims.

Treatment of Traumatic Arthritis: General Considerations. To hasten return of articular function in cases of traumatic arthritis and to prevent as much residual disability and posttraumatic neurosis as possible, the application of physical therapy should not be left solely to the patient but should be supervised carefully by physicians or technicians skilled in its use. Simple methods of home physical therapy should be supplemented by suitable forms of professional physical therapy and occupational therapy. The special advantages of hydrotherapy in cases of traumatic arthritis were again stressed (Copeman). Lasher was disappointed in the effects of heat on many posttraumatic articular effusions. Measurements of articular effusions two or three hours after local application of heat often indicated slight increases, rather than reductions, in articular size. Hence he favored early aspiration of effusions. Truslow described a simplified compression bandage for traumatized joints with or without effusion. One layer of an Ace bandage is applied, for example, to the knee. Then two pieces of sponge rubber, each about 8 inches long and 2½ inches wide with a small crescent cut out to fit the sides of the patella, are placed one on each side of the patella. The application of the Ace bandage is then continued until the rubber is entirely enclosed.

Fever Therapy for Gonorrheal Arthritis

Summary. These reports present further evidence that complete cures are obtained in 70 to 90 per cent of acute cases and in about 60 to 80 per cent of chronic cases of gonorrheal arthritis in which from two to four (occasionally six or eight) fever sessions are used. The fever sessions almost uniformly consisted of five or six, occasionally seven, hours at 106 to 107 F. (rectal) given every two to four days.

(Fever therapy can only arrest the active disease; it cannot restore tissues already damaged; therefore, it should be used early if at all.—Ed.)

Conclusions on the Merits of Fever Therapy for Gonorrhea and Gonorrheal Arthritis

At a round table conference of 23 genitourinary specialists the consensus was that "properly used, fever therapy is probably the most effective form of therapy for gonoccocal infections, but the cost of treatment and the limited number of hospitals where the technic is safely and effectively used constitute its greatest limitation." One critic queried: "Is it logical to submit an average case to this severe treatment? Must we use a cannon to bring down a duck? The punishment of fever therapy in the male does not seem to fit the crime" (Strachstein).

Tuberculous Arthritis: General Comments

Clinical Data. The course of tuberculous arthritis can be divided, according to Whitaker, into four phases: (1) During the *period of onset* a tuberculous focus develops in articular bone; this focus may or may not be preceded by one in synovial tissue. (2) During the *destructive phase* articular dissolution tends to occur, general decalcification always is present, and abscesses sometimes are seen. Eventually destruction ceases and the next phase begins imperceptibly. (3) The *quiescent phase* is not characterized by any particular clinical signs. (4) The *period of repair* is characterized by increased bony density, calcification of any bony abscesses present and subsequent bony ankylosis.

Treatment. Prophylactic therapy is of the greatest importance. In Australia most cases are caused by human, not bovine, strains of tubercle bacilli. A definite contact between the patient and a person with open pulmonary

tuberculosis was established in 50 per cent of Whitaker's cases.

Since tuberculous arthritis is merely a local manifestation of a constitutional disease its treatment must be (1) constitutional and (2) local. Fundamental features of constitutional therapy include rest, fresh air, sunlight, diet therapy, and removal of septic foci. According to Colvin, adequate constitutional treatment cannot be obtained in general hospitals, but only at special open-air hospitals where proper constitutional and local therapy can be combined. Recently physicians have expressed a growing conservatism as to whether the most successful local therapy involves use of surgical or nonsurgical procedures. Current reports again indicate an increased appreciation of the value of conservative, i.e., nonsurgical methods.

Treatment of Atrophic Arthritis

Some physicians are distressingly pessimistic about the value of treatment. Others are more optimistic: it was White's opinion that "there is no chronic disease for which so much may be done." The ones to do it are the patient himself and his family physician because arthritis begins and ends in the home even if there is an interval of luxurious care in a hospital. Hence a heavy responsibility rests on the shoulders of the general practitioner, who, although he produces no statistics, has no publicity agent and keeps his records, not on paper, but often only in his head, often can accomplish a cure by supervising simple forms of treatment in the patient's own home.

Rest and Movement. Rest was called "the keystone of treatment" and "the most important single factor in treatment" but one which should not be overdone. The patients should rest prone one hour after each meal with joints in the position of least strain. This can best be done by the use of splintage in light plaster shells. Rest in these moulds relieves pain and reflex muscle spasm and prevents deformity therefrom. But complete rest must not be continued for more than a few (at most seven) days. Prolonged complete rest is as dangerous as the advice often given to patients to "walk it off" or "keep about at all costs." An adequate range of articular motion must be maintained even during rest to sustain and improve muscle and joint function. Joints should be exercised within limits of their tolerance. Both rest and exercise should be prescribed in exact doses. Bradford outlined a system of exercises useful for bedridden as well as ambulatory patients; they should be instituted long before the patient is ready to get out of bed.

The technic of contrast baths differs in various clinics: in many the alternating applications of hot and cold were given empirically for one minute each. Pennington used applications of three minutes each but considered them unsuited for patients with impaired peripheral circulation. Woodmansey, Collins and Ernst made an interesting study on the physiologic responses of different "normals" and patients with atrophic arthritis to contrast baths of different lengths.

Ultraviolet irradiation was strongly approved and considered by some more useful and "curative" than infra-red rays. Contraindications to heliotherapy are febrile arthritis, the appearance of general or local reactions, and the coincidental presence of active tuberculosis, myocarditis or general debility.

Modern Conceptions of Backache

Henry W. Meyerding, M.D., and George A. Pollock, M.D., Rochester, Minnesota. In Journal-Lancet, LX:5:225, May 1940.

Backache is one of the most common complaints met with in the practice of modern medicine and it presents problems in differential diagnosis which tax the diagnostic ability of many physicians.

Backache is not a disease but may be the symptom of a multiplicity of varying disorders, the elucidation of which frequently presents problems of overwhelming difficulty. The classification given is not exhaustive, but for practical purposes it presents a summary of the more common causes of pain in the back.

By the use of conservative measures, in which are combined the antispasmodic effects of physical therapy and the bracing action of external supports, much benefit will be given to those who suffer from the idiopathic form of bachache. The reduction of excessive overweight and the adoption of less arduous activities combined with the improvement of the general physical state by sunbaths, moderate well-balanced exercises and good body mechanics will relieve backache in the great majority of cases. The authors are strongly opposed to the tendency to treat all forms of pain in the lower part of the back by surgical methods without a thorough and sometimes prolonged trial of the less spectacular method of conservative care, and they unhesitatingly condemn the practice of fusion operations in the absence of a demonstrable structural defect.

Regulation of Circulation in the Skin and Muscles of the Lower Extremities

Mae Friedlander, Samuel Silbert, M.D., and William Bierman, M.D. In Amer. J. Med. Sci. 199:5:657, May 1940.

The investigations that the authors have carried on during the past three years have shown that the regulation of the circulation in the skin differs from that in the muscles of the lower extremities. In a previous publication we stated that lumbar sympathetic paralysis increases the circulation to the skin of the lower extremities but does not increase the circulation to the calf muscles. Subsequently Grant came to a similar conclusion in regard to the muscles of the upper extremities utilizing the plethysmographic method.

The mechanism by which hot arm baths affect the surface temperature of the toes has been studied by Pickering. He showed that the warmed blood returning from the upper extremities affected the heat regulating center in the brain and that secondary nervous impulses to the lower extremities resulted in vasodilatation. Such nervous impulses are carried by the sympathetic nervous system. The authors have shown that the changes noted in the skin surface temperature of the toes following hot forearm baths were not accompanied by corresponding changes in the calf muscles.

Seven different methods were employed to alter the circulation in the lower extremities. In all but one of them, changes in the circulation occurred in the skin with opposite or no changes in the muscles. These observations indicate that the circulatory response to therapeutic procedures is not necessarily parallel in the superficial and deep structures. Since sympathetic paralysis fails to increase the circulation of the muscles, the use of ganglionectomy for the treatment of intermittent claudication has no physiologic basis. Of all the methods studied, the use of intravenous injections of hypertonic salt solution is unique in its ability to increase the circulation in both the skin and muscles.

The major problem in the treatment of patients with peripheral vascular disease is the relief of intermittent claudication. Practically all patients with circulatory deficiency present this symptom and in more than one-half of them this is the only serious complaint. To relieve it, therapeutic procedures must be used that will increase the circulation in the muscles. On the other hand, when ulceration is present, a method of treatment which will increase the circulation of the skin is desirable.

It is no longer justifiable to conclude that an evident increase in the circulation in the skin is accompanied by a similar increase in underlying muscles. In the future each method of treatment must be studied to determine to what extent it independently affects the circulation of the muscles and the skin. It will then be possible for the clinician to utilize that method which answers his specific needs.

Exercise in Tuberculosis: A Plea for Conservatism

William J. Habeeb, M. D. In Ohio State Med. J., 36:6:609, June 1940.

In the treatment of tuberculosis the question of exercise occupies a place of primary importance. There is not a great deal written on the subject in the current literature. One would think it is a settled issue. There is, nevertheless, a wide divergence of opinion among tuberculosis physicians concerning exercise in the treatment of tuberculosis.

Those who believe in strict bed rest will consider every activity of the patient short of resting quietly in bed as exercise. Sitting up in bed, writing letters, drawing, knitting and so on are exercise by that standard. By another standard, such activities are not considered exercise at all. Activity merits the designation of exercise only after the patient is fully clothed and is going for outdoor walks.

Any activity which produces severe fatigue should not be persisted in. The fatigue is a symptom of overstrain and indicates that the body needs more rest. To continue a given amount of exercise, no matter how little, day after day in spite of marked fatigue is to court an increase in the tuberculosis.

Every case must be individualized. A blanket set of rules will not cover all cases. No two cases of tuberculosis are alike. It is obvious that patients with malaise, fever, rapid pulse and marked fatigue should be on bed rest.

Patients with minimal disease and positive sputum whether they have a cough or not should be in bed also. Exercise in such patients should not be permitted until a sufficient period of bed rest or a collapse measure in addition to bed rest has converted the sputum and given the disease time to become stabilized.

In most sanatoria the amount of exercise is well regulated and the patient's activity is kept within safe limits. After the patient leaves the sanatorium the advice concerning exercise frequently is disregarded.

Recent Progress in Physical Therapy

Richard Kovacs, New York, N. Y. In Med. Record, 151:8:261, April 17, 1940.

A new method of applying heated air for pelvic heating has been described by Newman. Air heated up to 103 F. is circulated through a specially shaped, thin walled rubber bag which is inserted in the vagina in a collapsed state and then inflated with air. Proper distention eliminates hot spots and results in an even distribution of heat. Compared to the older Elliot method of pelvic heating with the hot water, this method offers the advantage of avoiding the discomfort of the weight of the water bag and also the possible danger of scalding by hot water if the bag should tear during a treatment. By circulating air through a cooling coil low temperatures may be secured in the rubber bag.

Clinical experience during the past few years has developed two ranges of therapeutic fever, mild and severe. Mild fevers from 103 to 105 F. are maintained for three to six hours and may be employed in syphilis and its various sequelae, in chorea, in multiple sclerosis as well as in selected forms of arthritis and rheumatoid conditions. Severe fever from 105 to 107 F. are maintained for from five to seven hours or longer and are employed chiefly in gonorrhea and its complications.

The advent of sulfanilamide therapy has resulted in its preference in the treatment of gonorrhea; however, in view of a percentage of failure even with adequate sulfanilamide therapy, Ballenger et al. conclude that fever therapy will continue to be an important therapeutic adjunct in treatment of certain more resistant cases of gonorrhea.

In the field of light therapy there have been extensive studies of the basic photochemical effects of the various portions of the ultraviolet spectrum in the form of erythema, pigmentation, antirachitic and bactericidal action and the effects on blood and metabolism. New types of ultraviolet generators emitting radiation chiefly in the bactericidal range of 2,537 angstroms were introduced and the effect of such radiation on skin conditions, wound healing and air sterilization studied.

The thin window lamp is one of the new types of mercury glow lamps emitting about fifty-five per cent short ultraviolet radiation, around 2,537 angstroms, and some thirty-five per cent infra-red radiation. This lamp is employed for local treatment only and can be applied in close contact to the skin up to ten minutes without causing blistering. The clinical experience of the author and others has shown the effectiveness of such radiation in pyogenic infections, fungus and parasitic affections of the skin and sluggish ulcers and wounds. The relief of pain in minor infections and some ulcers after one or two treatments often is striking. The additional advantage of this application in skin infections such as impetigo is the avoidance of messy ointments.

Air sterilization of operating rooms and hospital wards by similar types of ultraviolet generators also has been the subject of extensive research. It was reported by Hart that by such elimination of air borne contamination in combination with meticulous operating room asepsis and other safeguards one may almost entirely avoid wound infections in clean primary incisions. It also is claimed that such ultraviolet radiation exerts a beneficial effect on wound healing. These claims now await corroboration by extensive clinical investigation.

Postural Correction in Children

Lewis Cozen, M. D. In Arch. Ped., LVII: 5:287, May 1940.

Although it is generally believed that correction of posture in children is valuable, there has been little written to prove this current idea.

The White House Conference on Child Health, as reported by Jones, enunciated the attitude of the physicians who were present at the conference. The impression of these men was that:

1. There is an association, perhaps casual, between posture and failure to gain weight.
2. Digestive disturbances may improve with correction of posture where there is no organic lesion.
3. Good posture is affiliated with a general feeling of well-being and alertness.

In attempting to ascertain the effects of treatment for malposture it was decided to follow those patients who had been treated for a period of six months. It was felt that a shorter period of treatment could not be termed as adequate. Consecutive, unselected patients who were referred to the clinic because of poor posture were used in the series. Forty-eight patients were thus studied.

Therapy for these children with poor posture consisted of instruction by demonstration to both parent and child to correct anatomical and functional poise for the particular child involved. Exercises were performed at the clinic weekly or biweekly and daily at home.

These exercises consisted of a group designated to correct any existing deformity as well as to teach the child correct body mechanics.

Is there any relation between the degree of posture improvement obtained and the well-being of the child? To answer this question, it was necessary to compare those cases whose posture improved enormously with those who showed no change from their original malposture. By far the great majority of the children (44) developed good or excellent poise. Only three of the 48 patients had an exceptionally marked improvement of posture. In only one of the 48 patients was the posture unimproved by training.

It is to be noted that the child whose posture remained unimproved by training made significant gains in height and in weight. If the posture had improved following training, would the gains have been greater? As a conjecture, we should be willing to hazard an answer in the affirmative.

What, then, may be expected as the result of posture correction in children? In the great majority of cases (96 per cent in the present series) the parents will notice improvement in their child physically, mentally, or both.

In this series of cases it was found that for those children whose parents noted a marked benefit of posture correction, measurement revealed greater gains in weight, height and vital capacity than in the group of children whose parents noted little or no value of the treatment. Whether or not posture training was of any aid to this smaller group that had the lesser rate of growth, etc., is open to question.

Judging from this series of cases one may render a fairly accurate prognosis in children who are being treated for malposture. It is possible to assure the parents that if they and the child cooperate in the treatment, the parents probably will note an improvement in the well-being of their child.

Tendinitis of the Shoulder

Donald E. McKenna, M.D., F. A. C. S. Brooklyn, N. Y. In Med. Times, 68:6:259, June 1940.

The following method has been found suitable for the management either of supraspinatus or biceps tendinitis. Some authors will disagree, but the most comfortable initial gesture is immobilization. Place a pad of cotton or felt in the axilla, strap the arm to the side, apply a shoulder cap of adhesive to prevent shoulder girdle action and suspend the forearm in a sling.

Immobilization of the arm should be continued only during the very acute phase. As soon as restful sleep is obtained it should be discontinued.

Physical therapy is helpful. Radiant heat in the form of infra-red is most practical and efficient. Diathermy or short wave, provided the heat rays pass through the affected area, is very efficacious. Indifferent results often are the result of faulty application of the plates or bands. Massage and passive motion should be indulged in as soon as the acute pain has subsided, usually between the seventh and tenth days. Daily home exercises are essential so soon as massage is instituted. Arm swinging with the trunk flexed is the easiest to perform; finger climbing with the patient standing beside a wall is the next most practical measure. Passive elevation of the arm by a member of the family while the patient is lying on the back is another acceptable method. Until the patient comes to the realization that fifty per cent of the process of rehabilitation is up to his own efforts, and that the cure does not come in a bottle, the turning point in recovery has not been reached.

Pantendinitis — the frozen shoulder — is most likely to confuse the clinician unless a very careful history is obtained. The arm is fixed to the side. All motions at the shoulder have been lost. Abduction, a mere 40 to 45 degrees, is accomplished by painful substitutionary movements of the scapula. Frequently there is a notable wasting of the infrascapular muscle, while the deltoid is atonic and the forearm muscles flabby. Handgrasp is very weak, yet passively there is no dysfunction of the elbow, wrist or finger joint motion, no gross alteration of the reflexes, nor sensory changes over the peripheral distribution of the radial, ulnar or median nerves.

Patients with pantendinitis should be hospitalized and subjected to gradual traction on the extremity by means of adhesive plaster, with the parts suspended by means of weight and pulleys from a Balkan frame.

On discharge, usually at the end of a fortnight, after-care is persisted with for approximately three months. Daily home exercises are insisted upon; physical therapy in the form of baking, massage and stretching is administered, preferably by the physician, at two-day intervals, gradually extending it to three or five days.

Myositis Ossificans Traumatica

Augustus Thorndike, Jr., M.D., F.A.C.S. Boston, Massachusetts. In J. B. and Joint Surg., XXII:2:315, April 1940.

The author's conclusions are:

1. Myositis ossificans traumatica is an inflammatory process of muscle in its early stages and before ossification is actually demonstrated by the roentgen ray. "Tumor," "dolor," and "calor" are all present at this stage.

2. This inflammatory process gradually subsides as ossification takes place.

3. The ossification gradually is absorbed in part and sometimes in full, depending upon its size and location. The muscle function returns to normal, except in those instances where the ossification occurs near a joint.

4. Treatment necessitates the immediate application of cold and a compression bandage to control hemorrhage, and later heat to aid in the absorption of the hematoma. Of great importance is the avoidance of massage on all severe and tender muscle contusions.

5. Operative removal of the ossification is indicated only in those cases in which it occurs near a joint in the origin or the insertion of a muscle, where joint function is permanently impaired, and then only from twelve to twenty-four months after the injury.

The Therapy of the Cook County Hospital: The Therapy of Acute Peripheral Circulation Failure: Syncope, Shock and Collapse

Edited by Bernard Fantus, M. D. In collaboration with Dr. Lindon Seed. In J. A. M. A., May 18, 1940.

Traumatic Shock

Traumatic shock, as it is seen in hospitals, should be defined as a depression of the vital processes consequent on severe physical injury and due to a great insufficiency in volume of circulating blood, which may be partly due to actual loss of blood to the exterior into some of the body cavities or into the soft tissues and partly or entirely due to "plasmosis," i.e., exudation of blood plasma into the injured area.

The Stages of Shock.—The so-called primary shock is essentially syncope. It is more severe in adults than in children and in nervous than in phlegmatic persons, and is also severe in persons crippled by organic disease; it is more prone to occur under the influence of hunger, fatigue, exposure, fear and terror.

The "reaction" stage usually sets in within a few hours if the condition is not speedily fatal. The reaction is possibly due to a number of influences: the waning of the syncopal factor, or the vasopressor action of accumulating carbon dioxide and of adrenal secretion. Marked delay in the onset of the reaction should cause one to look for complicating hemorrhage, hemoconcentration collapse, or acidosis.

The stage of "secondary shock" may supervene on the reaction or on alternate periods of reaction and depression. The secondary shock is usually due to hemorrhage and/or exudation. In either case the reduction in the volume of circulating fluid results in stimulation of the vasomotor center, so as to maintain a degree of circulatory activity compatible with life. Under these circumstances the vasomotor center keeps, by splanchnic vasoconstriction, the blood pressure higher than it would otherwise be. If in spite of this the blood volume continues to fall, the condition passes insensibly into "vasodilatation" collapse from failure of the vasomotor center due to inadequate blood supply, and now the splanchnic blood vessels dilate.

Treatment.—1. Absolute rest should be secured and pain and distress relieved.

2. Body heat must be maintained. The tendency to subnormal temperature causes a vicious circle, because there is no greater depressant to vital function than a subnormal temperature. In its presence, stimulants fail to act. Heat may be applied by an electric light bath, hot blankets, hot bricks or bottles filled with hot water; but great care should be exercised against burning the patient, for when the circulation is poor, tissue is easily damaged by heat. If the temperature is quite low, the quickest way of restoring it is by a hot bath or a hot wet pack, for dry heat penetrates but slowly and poorly. One may pour hot water (avoid scalding!) over the clothing of a person to be resuscitated after drowning. Exposure to cold and wet greatly aggravates subnormal temperature and shock. Hot drinks, hot enemas and hot infusions are helpful. Diathermy is advocated.

3. Blood circulation should be maintained in the vital parts of the body by having the head on a level with the body or lower than the feet, provided this does not cause cyanosis and there is no head injury. In any severe case autotransfusion (bandaging limbs after raising each in turn for a few minutes) may be of value.

Lost body fluid should be restored.

Collapse

Treatment.—If the body temperature is subnormal, external heat is the single most important stimulant. While the hot bath is most efficient, an electric light bath under "cradled" bed clothes is the next best, if the patient should not be subjected to the strain of the bath. The use of hot water bags or bottles carries with it the danger of inducing burns if they happen to be placed too close to the skin; and burns occur in the collapsed patient much more readily than in one whose circulation is more adequate. In febrile collapse (internal temperature high, skin pale), bringing the blood to the skin by hot sponging or a mustard bath or mustard pack followed by a brief cool procedure, to "fix" the blood in the skin, is the method of choice.

Underwater Therapy in Chronic Arthritis

V. Eugene Frazier, M. D. In J. Missouri State Medical Assoc., 37:5:192, May 1940.

Patients were taken to a specially constructed swimming pool each day where underwater exercises were given under the guidance of a physical therapist. Some of the patients were so deformed that it was necessary to lower them into the water with a traveling hoist device. A table was placed under water on which passive exercises could be carried out by the therapist for those who were unable to exercise unassisted. Even the most painful joints generally could be manipulated without pain when the gravitational effect was eliminated. Patients who were able often devised their own exercises.

The water in the pool was maintained at a temperature of from 90 to 96 F. which not only was comfortable to the patient but also helped considerably to relax the muscles associated with the involved joints, thus further facilitating motion and also reducing pain. Heat is the time honored aid in the treatment of sore joints, and what better way can be found to supply moist heat to a joint than by immersing it in the pool. Muscles that have been weakened and atrophied either as part of the arthritic process or from disuse are protected and also benefited by the stimulating and massaging action of the warm water. When the patient is assured that no pain will result from action of a joint (due to the effective removal of gravity) he is prompted to indulge in active motion with benefit to the attached muscle groups as well as to the joint. Patients with badly involved knees, ankles and hips, who otherwise are unable to be out of a wheel chair, in many cases are able to walk in the pool with marked improvement to both muscles and joints. Furthermore, the patient has a sense of security against falling and against pain which causes him to put forth much more effort and to be much more bold than is the case when gravity is not eliminated.

Perhaps of even greater benefit than that derived from the joint exercise is the benefit to the morale by this method.

The author feels that he can say with safety that of the gross admissions of chronic arthritic patients fully 50 per cent left the hospital after an average stay of forty-five days with what both the patient and physician considered worthwhile improvement. Of those who were given the hydrotherapy pool treatments at least 75 per cent left with a like degree of recovery.

The Therapeutic Pool

Matthew B. Ray, D. S. O., M. D. In Lancet, No. 6085, April 13, 1940.

Of the various means of applying heat to the surface of the body water is probably the best. This is no doubt due to its high specific heat, by which is meant the quantity of heat absorbed or evolved when a unit mass of a substance undergoes an increase of temperature of 1 C.

The news-letter circulated in January 1940 by the Central Council for the Care of Cripples says: ". . . But when we come to the question of restoration of function, something more is required than is generally found in the massage and physical therapy departments of a hospital. Massage, movements, electrical treatment serve their purpose up to a point, but actual use of the damaged limb, if possible under conditions which distract the attention from the disability, have a greater value. For this reason, facilities for exercise in a gymnasium for indoor and outdoor games and for light work are required; and an instructor with the necessary persuasive power should be available to help the patients to resume their activities and to get back their confidence."

It would not be easy to find a more cogent argument for more pools in this country than that supplied by this paragraph. The therapeutic pool does supply something more than massage, movements and electrical treatments, after these have served their purpose, because a patient, when he finds that movements which

were difficult or impossible become comparatively easy under water, is encouraged and strengthened in his determination to persevere in his efforts. It appears, therefore, that the therapeutic pool occupies a position midway between ordinary massage and electrotherapy and occupational therapy. One has but to see a therapeutic pool in use and talk to the patients undergoing treatment to be convinced of its efficacy.

Treatment of Atrophic Arthritis with Artificial Fever Therapy

Walter M. Solomon, M.D., and Robert M. Stecher, M.D., Cleveland. Arch. P. T. XXI:6:339, June 1940.

A review of our experience shows that artificial fever therapy failed to cure a single case of atrophic arthritis. It may further be said that this treatment failed permanently to arrest the disease. This does not mean, however, that artificial fever therapy is totally without benefit to patients with atrophic arthritis. Fever therapy gave partial relief of pain and stiffness in 85 patients, or 75 per cent. At times relief persisted for only one or two days but occasionally it continued for several weeks. Subsequent treatments frequently were disappointing to the patients because improvement was no greater than that obtained after the first one, but when treatments were repeated the duration of benefit became prolonged. As a result of this effect the time interval between treatments could be lengthened without deleterious effect and a partial remission was effected. The disease in several patients has attained such a degree of stability that only three or four treatments a year are necessary to keep the patients relatively comfortable and active.

Atrophic arthritis characteristically produces damage and destruction to joints of such a nature as to seem utterly irreparable. Effective therapy should prevent permanent joint changes if applied sufficiently early in the disease or should prevent further progress of such changes which are already present. Effective therapy also should eliminate joint inflammation, provide restoration of general health and prevent exacerbations of the disease. Such ideal objectives are not now attainable in a satisfactory proportion of cases of atrophic arthritis by any known method of therapy. Certainly artificial fever therapy does not accomplish them. Until the specific nature of the disease is recognized, symptomatic treatment is the best we can offer. This includes physical and emotional rest, an adequate and well-rounded diet, proper elimination of waste products and the relief of joint pains by medication and physical therapy.

The present study indicates that artificial fever therapy is not a cure for atrophic arthritis. It does not secure permanent relief of symptoms nor does it promise substantial increase of joint function or bodily activity to the patient. Artificial fever therapy does offer a greater degree of temporary relief of joint pain and stiffness than any other therapy with which we are familiar. This relief is sufficient to warrant the use of this form of treatment in selected cases.

Role of Exercise in Cardiac Disease and Edema

A. A. Sussman, M. D., Baltimore, Md. In Arch. P. T., XXI:6:325, June 1940.

Exercises may be started during the second week of treatment, beginning with simple deep breathing efforts with wide-open windows, followed in about a week with such leg exercises as have been employed in the treatment of peripheral arterial disease and general massage except varicosed legs. A few minutes of unsupported sitting in the bed, dropping the feet over the side of the bed and finally after eight weeks, even though the edema still be present, the patient is helped out of bed, seated upright in a chair with feet supported on an ottoman or stool. The same principle of postural changes is embodied in the Sanders motorized bed with the added advantage in the latter of avoiding undue fatigue of the patient. Mental as well as physical improvement will be evident.

Concerning the nature of further exercise, resistance movements, simple stretching calisthenics, a few steps of walking about the room —all may be employed.

The authors do not wish to make any definite conclusions from such scant material. We do know that faradic stimulation of large areas of skeletal muscles will raise the venous pressure, and if the concept of shock, which the physiologists associate with collapse of the venous system and with hypotonia of skeletal muscles, is correct, the above simple method of raising venous pressure may be of considerable help in the treatment of all forms of shock.

This paper is presented to acquaint physicians with another use of faradic stimulation. It is the hope of the authors that this method

of raising venous pressure will be brought to the attention of the surgical staffs of all the hospitals so that the very occasional case of shock which occurs here and there may be so treated and the reports of the success or failure of this treatment may at a future time give us the knowledge whether or not the cause of shock has been overcome.

Treatment of Gonorrhea by Artificial Fever Alone and in Combination with Sulfanilamide

Alvin W. Folkenberg, M.D., and Elmer Belt, M.D. In Arch. P. T., XXI:4:203, April 1940.

The authors present a series of 100 consecutive patients treated for gonorrhea with a single 10 hour fever session at 106.7 F. (rectal). The incidence of cure was 87 per cent. Sulfanilamide and its related compounds provide a simple treatment for gonococcic infections, which when combined with mild local treatment is effective in 80 per cent. A plan is outlined for combined chemotherapy and artificial fever in patients resistant to sulfanilamide and local treatment. This combination has cured 86 per cent of these resistant cases.

For the few cases not cured by these combined efforts the authors suggest giving a fever equal to the vitro thermal death time of the patient's own strain of gonococcus. This method will result in an incidence of cure approaching 100 per cent. The more simple and less hazardous methods should be tried before resorting to the long fevers ordinarily required in the thermal death time procedure.

Paralysis of the Serratus Magnus Muscle Caused by Lesions of the Long Thoracic Nerve

Darrell O. Overpeck, M. D., and Ralph K. Ghormley, M. D. In J. A. M. A., May 18, 1940.

The authors state that the function of the serratus magnus muscle is mainly to aid in fixing the scapula to the thorax when the arm is elevated, particularly anteriorly, and also to rotate the scapula in abduction and during forward elevation of the arm at the shoulder. Stookey has proposed a more elaborate interpretation of the functioning of the serratus magnus muscle than is set forth in the foregoing sentence. He wrote that during elevation of the arm there are three cycles: the first is carried out by the deltoid and supraspinatus muscles, the second by the serratus magnus, trapezius, rhomboideus and levator scapulae muscles, and the third by the action of both the deltoid and supraspinatus muscles.

The most prominent symptom of isolated paralysis of the long thoracic nerve and the serratus magnus muscle is pain. Pain usually extends along the base of the neck and downward over the scapular and deltoid regions on the affected side. The second most common symptom is the patient's fatigue on elevating the arm or the inability fully to elevate the arm. On examination of the patient, the principal clinical observations are weakness of the pushing power of the affected shoulder and weakness of the abducting power of the arm above the horizontal plane.

Trauma was the chief causative agent in the authors' series, twenty-three instances of the condition, or 82 per cent of the total number of cases, being the result of some type of trauma.

The authors divide the treatment into two types: conservative and operative. Various types of conservative measures may be tried, such as supporting splints and bandages and physical therapy measures such as heat, massage and galvanic stimulation. Many mechanical appliances have been devised, but none are adequate to substitute for the function of the serratus magnus muscle. Some type of mechanical support should be tried in order to relieve the patient of pain, if possible, and to relax tension on the serratus magnus muscle. Persistent efforts in conservative measures may give the patient complete recovery, as is demonstrated by the follow-up observations on our own group of patients. Reassurance on this basis may do much to aid the patient's recovery. Certainly, avoidance of heavy muscular effort involving the affected muscle should be advised.

In the present series, only conservative treatment was used; it consisted of physical therapy and in addition, in some instances, elevation of the arm of the patient for a period of several weeks.

A follow-up of fifteen patients indicated good results in eleven instances. There was complete recovery for seven of these eleven patients, whereas four patients enjoyed recovery of strength but had persistent winging of the scapula. Three patients whose conditions were caused by trauma did not recover.

Book Reviews

AND THE STUTTERER TALKED. By A. Herbert Kanter, M. D., and A. S. Kohn. Cloth. Price, $2.00. *Pp.* 236. *Boston: Bruce Humphries,* 1938.

It is well accepted today that the greatest percentage of the so-called "stutterers" are nervous individuals in whom the speech defect is the most dramatic outward expression of their personality problems. If one investigates carefully he may uncover definite feelings of inferiority and insecurity which have their roots in the early childhood of the stutterer. The authors approach the subject by relating in narrative form the story of an individual stutterer dealing with the particular psychic trauma and emotional problems which he had encountered. The cure of the speech defect depended upon intelligent psychotherapy dealing with the individual as a whole. Such a story will be found to be both interesting and instructive.

SUPERVISION IN PUBLIC HEALTH NURSING. By Violet H. Hodgson, Supervisor, Outpatient Tuberculosis Nursing, New York State Department of Health; Formerly Assistant Director, National Organization for Public Health Nursing. Cloth. Price, $2.50. *Pp.* 376. *New York: The Commonwealth Fund,* 1939.

In this monograph the historical development, the principles and the methods of organization and administration of public health nursing are discussed at length in order to define the framework within which supervision operates. The author has had an unusual opportunity to observe public health nursing practice and field supervisory needs throughout the country as former Assistant Director of the National Organization for Public Health Nursing and in her present position in the New York State Department of Health.

Supervision in public health nursing is discussed from the standpoint of developing leadership which, in forming and improving policies and methods, draws upon the intelligence and abilities of staff members. The supervising nurses in public health work will find this volume a valuable aid in working out administrative problems and in developing methods appropriate to new situations.

COMPENDIUM OF REGIONAL DIAGNOSIS OF LESIONS OF THE BRAIN AND SPINAL CORD. By Robert Bing, translated by Webb Haymaker. Eleventh Edition. Cloth. Price, $5.00. *Pp.* 292, *with* 125 *illustrations and* 7 *plates. St. Louis: C. V. Mosby Company,* 1940.

This textbook is well known to all students of neurology. It is now in its eleventh edition and is better than ever. Part one deals with localization of spinal cord lesions, with clear, concise chapters on the anatomic and physiologic nature of the spinal cord. The second part deals with the localization of cerebral lesions, each page being rich with up-to-date, accurate facts concerning the central nervous system.

This book still ranks foremost among reference textbooks on neurology for the student and physician.

INTRODUCTION TO MEDICINE. By Don C. Sutton, M.S., M.D., Associate Professor of Medicine, Northwestern University School of Medicine; Attending Physician, Medical Division of the Cook County Hospital; Chief of the Cardiac Clinic, Cook County Hospital, Chicago; Attending Physician, Evanston Hospital. With introduction by Ada Belle McCleery, R.N., Superintendent, Evanston Hospital, Evanston, Illinois. Cloth. Price, $3.25. *Pp.* 642, *with* 158 *illustrations. St. Louis: The C. V. Mosby Company,* 1940.

This is a textbook of medicine for nurses. The first section gives the student a quick survey of the fundamental background of medicine. The second part contains descriptions of disease entities, including those required by the standards of the Committee on Curriculum of the National League on Nursing Education.

The symptoms, diagnosis and treatment are covered with a minimum of detail, but the treatment stresses especially the nurse's relation to such care. There is emphasis placed on the psychology of the patient to show the student nurse not only the different mental conditions that exist in different patients, but to teach her how properly to handle these different conditions.

The questions at the end of each chapter, the excellent illustrations, the concise and clear presentation of the whole subject by an experienced medical school teacher makes this volume the best textbook of medicine for nurses that has appeared in recent years.

A BIOLOGICAL APPROACH TO THE PROBLEM OF ABNORMAL BEHAVIOR. By Milton Harrington, M. D., Psychiatrist, Institution for Male Defective Delinquents, Napanock, N. Y.; formerly Consultant in Mental Hygiene, Dartmouth College. Cloth. Price, $4.00. Pp. 459. Lancaster, Pa.: The Science Press Printing Co., 1938.

The chief thesis of this presentation is that "the cause of all abnormal or unsatisfactory forms of behavior is to be found in the unfitness of the organism for its environment." Whereas most other writers on the subject of abnormal behavior pay most attention to the physical and psychologic make-up of the individual, this author adds to this the importance of the role of education and sociologic situations in the total reaction. In what he terms "psychophysiology" he describes sensation, emotion, memory and other fundamental human functions. This so-called "new approach," however, turns out to be an elaboration and, indeed, a complicated discussion of well-recognized basic principles of physiology and psychology. The author attempts to discuss psychobiology and psychoanalysis and verbalizes at great length on various aspects of behavior.

Although many chapters contain much worthwhile information, this book as a whole can scarcely be recommended as a valuable contribution to the subject.

AMERICAN DOCTORS OF DESTINY. By Frank J. Jirka. With an introduction by Harold W. Camp and 20 portraits by Raymond Warren. Cloth. Price, $3.75. Pp. 361. Chicago: Normandie House, 1940.

This is an interesting collection of historical narratives of the lives of those American physicians and surgeons whose service to the nation and to the world has transcended the scope of their profession. In his chapter on the first physicians in America, Jirka notes that fifteen years after Cortez's capture of the City of Mexico a school was established there, one of the studies being medicine. In Peru in 1551, eighteen years after Pizarro's conquest, the capital had a university where the degree of doctor of medicine was conferred for the first time in the New World. The first medical book, Francisco Bravo's "Opera Medicinalia," was published in 1570.

In the chapter on the "American Doctors of the Revolution" the author notes that at least ten medical men are known to have taken part in the attack on the retreating British column after the battles at Lexington and Concord. Dr. Joseph Warren was a Major-General of Massachusetts and was killed in the battle of Bunker Hill.

In a chapter on "Chicago's Old Father Dearborn" Jirka relates the history of Dearborn whose medical career was interrupted by the Revolutionary War, in which his bravery and skill won a high rank for him. Although he never was as far west as Illinois, the name of Major-General Henry Dearborn was given to the log blockhouse which marks Chicago's beginning.

Such interesting facts are multiplied in the twenty-one chapters, and the volume can be recommended to everyone interested in medical history.

TEXTBOOK OF HEALTHFUL LIVING. By Harold S. Diehl, M.A., M.D., Sc.D., Professor of Preventive Medicine and Public Health, and Dean of the Medical Sciences, University of Minnesota; Director, Health Studies, American Youth Commission; Member, Health Council Boys' Clubs of America; Former President, American Student Health Association. Second edition. Cloth. Price, $2.50. Pp. 634, with 63 illustrations. New York & London: McGraw-Hill Book Company, Inc., 1939.

This is a textbook for college courses in personnal hygiene. There are chapters on the possibilities of longer life and better health; major health problems; why we must eat and drink; the choice of foods; weight and its control; digestive disturbances; dietary dangers; stimulants; exercise, fatigue and rest; sunlight and fresh air; specific disease prevention; colds and influenza; care of the nose, throat and ears; the conservation of vision; sound teeth; glands of internal secretion; normal sex life; modern parenthood; mental health; health problems of advancing years; choosing a health adviser; community health and organized health work.

The discussions are concise but adequate. It is written in an excellent literary style. The subject material is carefully selected and lives up to the volume's dedication: "To those who prefer facts to fads, sanity to superstition, understanding to belief." It can be recommended to those seeking information concerning the preservation and improvement of health.

THE PATHOLOGY OF INTERNAL DISEASES. By William Boyd, M.D., LL.D., M.R.C.P. (Ed.), F.R.C.P. (Lond.), F.R.S.C., Professor of Pathology and Bacteriology in the University of Toronto, Toronto; formerly Professor of Pathology in the University of Manitoba, Winnipeg, Canada. Third Edition. Cloth. Price, $10.00. Pp. 874, with 357 illustrations. Philadelphia: Lea & Febiger, 1940.

In this third edition a number of sections have been rewritten and much new material has been added. The size of the book has not been increased owing to the deletion of older material and to the use of small type for sections of minor importance.

Many new illustrations have been added to this edition. The following sections have been rewritten: arterial hypertension, the pathogenesis of lobar pneumonia, bronchiectasis, the etiology of glomerulonephritis, hemorrhagic pancreatic necrosis, Addison's disease, the changes in the lung in rheumatic fever and in mitral stenosis, subdural hemorrhage, and in the iron-deficiency anemias.

The new material which has been added includes the following subjects: the geography of rheumatic heart disease, cardiac hypertrophy, Fiedler's myocarditis, hypertensive heart disease, intimal coronary hemorrhage, vitamin K in relation to bleeding in jaundice, the increased frequency of bronchogenic carcinoma, the relation of the pituitary to pancreatic diabetes, Lederer's acute hemolytic anemia, the Marchiafava-Micheli nocturnal type of paroxysmal hemoglobinuria, the "Fleckmilz" of Feitis, the reticuloses, equine encephalomyelitis, myotonia congenita and myotonia atrophica, extrarenal uremia, the relation of pyelonephritis to arterial hypertension, and the prevention of silicosis.

This is a book that will aid the physician in his daily practice. It can be recommended highly to every medical student and physician.

ARTHRITIS AND ALLIED CONDITIONS. By Bernard I. Comroe, A.B., M.D., F.A.C.P., Instructor in Medicine, University of Pennsylvania; Ward Physician, Hospital of the University of Pennsylvania. Cloth. Price, $8.50. Pp. 752, with 200 illustrations. Philadelphia: Lea & Febiger, 1940.

This monograph on arthritis is designed to be helpful rather than speculative and reflects an extensive experience with this baffling disease. It gives exact details of methods of diagnosis, discusses the prognosis, surveys the literature and presents the results of the author's results with the different forms of therapy.

There are many chapters and sections of special interest to the physical therapist. There are chapters on splinting of affected joints, physical therapy in rheumatoid arthritis, iontophoresis, massage in rheumatoid arthritis, exercise in rheumatoid arthritis, orthopedic management of arthritis, fever therapy and spas. In the chapters on osteoarthritis, fibrositis, painful shoulder, painful feet, backache and sciatica there are excellent sections on physical therapy. This book deserves a place in the library of every physical therapy technician who treats arthritis and allied conditions.

DOCTORS IN SHIRT SLEEVES. MUSINGS ON HOBBIES, MEALS, PATIENTS, SPORT AND PHILOSOPHY. Edited by Sir Henry Bashford. Cloth. Price, $2.50. Pp. 294. New York: Veritas Press, Inc., 1940.

For the last two or three years, the "Lancet"—a well known British medical journal—has had a column under the heading of "Grains and Scruples." In this column have appeared essays by physicians about their personal reminiscences and reflections. This book is a collection of the papers appearing in this column.

Many subjects are considered: Freud, Dr. Rabelais, dictators, war and emancipated women. Many illustrations could be cited to prove the interest of these memories. In the last essay, "Retirement and a Garden" by Philip Gosse, the picture of a village doctor's emotions is beautifully drawn:

"The great bugbear of the village doctor is that he is always in view of his patients; his washing, if the simile is allowable, is always hanging up on the line in full sight of the public. But worst of all are his failures. Every doctor has had his failures, and all honest ones admit it. Even 'Harley Street doctors' are not always successful, but they do not live continually in close proximity to their mishaps. Personally I owe many things to the outbreak of the Great War: some good, some the reverse. First amongst the good things I place the opportunity it gave me to escape from the daily shame of seeing Stone, the postman, as he limped from house to house. He had a badly united fracture of the femur, with at least one inch of shortening, and in

my youthful enthusiasm as a newly squatted doctor I had rashly undertaken to treat him, thinking in my innocence to score thereby off another doctor in the neighborhood—an old man and a Scot and, as I learned too late, a wise one. Now, no city doctor could ever undergo the mortification which I suffered for three years as I watched the postman hobbling about, proclaiming to the little world we live in what an utter mess I had made of his leg."

This volume offers many original presentations of doctors' thoughts on many subjects of our day. It is most interesting.

"BREATHING MACHINES" AND THEIR USE IN TREATMENT: REPORT OF THE RESPIRATORS (POLIOMYELITIS) COMMITTEE. Medical Research Council, Special Report Series, No. 237. Paper. Price, 60 cents; 2s. Pp. 90, with illustrations. New York: British Library of Information; London: His Majesty's Stationery Office, 1939.

This report discusses the manual methods of artificial respiration and the enumeration and description of breathing machines. A complete description is given of power driven machines. These are divided into the machines involving enclosure of the body but not the head of the patient and those involving total enclosure of the body of the patient. The hand operated machines are divided into those devices depending upon gravity and those depending upon lung inflation.

The greater part of this monograph is devoted to the clinical experience in Great Britain and Ireland with these machines. It can be recommended to those interested in artifical respiration and anterior poliomyelitis.

PRINCIPLES OF ORTHOPEDIC SURGERY. By James Warren Sever, M.D., Assistant Professor of Orthopedic Surgery, Harvard Medical School; Orthopedic Surgeon, Children's Hospital, Boston, Cambridge Hospital, Cambridge, Waltham Hospital, Waltham, Quincy Hospital, Quincy; Associate Surgeon, Boston City Hospital; Medical Director to the Industrial School for Crippled and Deformed Children, Boston. Third edition. Fabrikoid. Price, $3.25. Pp. 418, with 224 illustrations. New York: The Macmillan Company, 1940.

Orthopedic surgery has been described and accepted by the American Orthopedic Association as the surgery of deformities and disabilities of the apparatus of locomotion. This broad field includes deformities and disabilities of the trunk as well as those of the arms and legs. They may be divided roughly into those which are congenital and those which have been acquired by accident or disease. In this book, the congenital defects are presented first.

A crippled or handicapped person is apt to become a dependent. The relationship between the orthopedic surgeon and the patient is important in order to prevent crippling. The author's viewpoint in this regard is: "After working for more than thirty-five years in orthopedic surgery, I am hopeful for the constantly increasing interest in crippled children, their physical care, education and economic usefulness, and the desire and interest on the part of society to give them a square deal, with every opportunity for happiness."

This volume is not intended to be a medical textbook but rather to supply the students with a knowledge of what orthopedic surgery comprehends. The material presented is drawn largely from the Children's Hospital in Boston, and the nursing technique is the result of many years of experience in its wards. This book can be recommended to nurses and physical therapy technicians caring for orthopedic patients.

AS THE TWIG IS BENT. By Leslie B. Hohman, M. D., Associate in Psychiatry, Johns Hopkins Medical School, Baltimore. Cloth. Price, $2.50. Pp. 291. New York: The Macmillan Company, 1940.

Psychologists and psychiatrists have for many years recognized and emphasized the importance of the early years of life in the development of the adult personality. It may be stated definitely that the neurotic adult is a victim of circumstances which might have been avoided. In the hands of parents and teachers rests the factors which determine the success or failure of the individual.

Without doubt this is the finest book written for the layman on the subject of mental hygiene. Indeed, physicians and specialists also may profit by careful reading of its contents. If such information could be placed in the hands of prospective parents it would help bring about a "new deal" for the child whose growing up is so dependent upon others in his environment.

THE 1939 YEAR BOOK OF NEUROLOGY, PSYCHIATRY AND ENDOCRINOLOGY. Neurology edited by Hans H. Reese, M. D., Professor of Neurology and Psychiatry, University of Wisconsin Medical School. Psychiatry edited by Nolan D. C. Lewis, M. D., Director, New York Psychiatric Institute and Hospital; Professor of Psychiatry, Columbia University. Endocrinology edited by Elmer L. Sevringhaus, M. D., Professor of Medicine, University of Wisconsin Medical School. Cloth. Price, $3.00. Pp. 784, with illustrations. Chicago, Illinois: Year Book Publishers, Inc., 1939.

The reputation of this annual summary of the literature in the specialties of neurology, psychiatry and endocrinology is well established by this time. The editors are careful and critical in their selection of worthwhile material from the usual overabundance of literature on these subjects. There is no doubt that the contents of this volume include the "cream of the crop," and one may well profit by reading it from cover to cover.

STUDIES FROM THE CENTER FOR RESEARCH IN CHILD HEALTH AND DEVELOPMENT, SCHOOL OF PUBLIC HEALTH, HARVARD UNIVERSITY. I: THE CENTER, THE GROUP UNDER OBSERVATION, SOURCES OF INFORMATION, AND STUDIES IN PROGRESS. By Harold C. Stuart, M. D., and Staff. Monographs of the Society for Research in Child Development. Volume IV: No. 1 (Serial No. 20). Paper. Price, $1.75. Pp. 261, with illustrations. Washington, D. C.: Society for Research in Child Development, National Research Council, 1939.

The work of the Center for Research in Child Health and Development in the School of Public Health of Harvard University is well known to those engaged in psychologic and sociologic studies of children. In this monograph a description is given of the organization of the Center and of the various types and methods of examination employed in the study. There is considerable data on physical growth correlated with general health and behavior.

STUDIES FROM THE CENTER FOR RESEARCH IN CHILD HEALTH AND DEVELOPMENT, SCHOOL OF PUBLIC HEALTH, HARVARD UNIVERSITY. II: TYPES, LEVELS, AND IRREGULARITIES OF RESPONSE TO A NURSERY SCHOOL SITUATION OF FORTY CHILDREN OBSERVED WITH SPECIAL REFERENCE TO THE HOME ENVIRONMENT. By Eleanor Slater with the Assistance of Ruth Beckwith and Lucille Behnke. Monographs of the Society for Research in Child Development, Volume IV, No. 2. (Serial No. 21). Paper. Price, $1.25. Pp. 148, with 8 illustrations. Washington, D. C.: Society for Research in Child Development, National Research Council, 1939.

This is a special study on the problem of the adaptation of children to new environments and experiences. Many observations are recorded in an attempt to answer questions regarding the development of so-called behavior patterns and those which arise through group activities. For those engaged in similar studies this monograph contains much interesting and valuable research material.

Chapter Directory

Carolina Chapter

President, Mabel Gordon, Duke Hospital, Durham, N. C.
Secretary, Mary Haskell, North Carolina Orthopedic Hospital, Gastonia, N. C.

Central New York Chapter

President, Mrs. Thelma Curley, Percy Hughes School, Jamesville Ave., Syracuse, N. Y.
Secretary, Mrs. M. Stell Murphy, 219 Genesee St., Utica, N. Y.

Colorado Chapter

President, Esther Wilcox, 1251 Emerson St., Denver, Colo.
Secretary, Mrs. Olga Nordblom, St. Luke's Hospital, Denver, Colo.

Connecticut Chapter

President, Mrs. Stephen A. Havanich, Jr., 30 Coleman St., Bridgeport, Conn.
Secretary, Mary Favor, 265 Washington Ave., Bridgeport, Conn.

District of Columbia Chapter

President, Mrs. Florence Harmon, St. Elizabeth's Hospital, Washington, D. C.
Secretary, Laura A. P. Sansbury, Washington Medical Bldg., Washington, D. C.

Eastern New York Chapter

President, Marguerite Stillman, 17 Dove St., Albany, N. Y.
Secretary, Grace L. Berry, 124 Rosa Road, Schenectady, N. Y.

Georgia Chapter

President, Mrs. H. J. Price, Emory University, Ga.

Secretary, Alice Lou Plastridge, Warm Springs Found., Warm Springs, Ga.

Illinois Chapter

President, Coralynn Davis, 5949 W. Circle Ave., Chicago, Ill.

Secretary, Helen Hartigan, 1511 E. 51st St., Chicago, Ill.

Indiana Chapter

President, Adelaide L. McGarrett, 4505 Marcy Lane, Indianapolis, Ind.

Secretary, Ethel C. Scofield, James E. Roberts School, Indianapolis, Ind.

Maine Chapter

President, Mary P. Clancey, 67 Gray St., Portland, Me.

Secretary, Mrs. Ruth A. O'Brion, 2 Charles Road, Cape Elizabeth, P. O. Portland, Me.

Maryland Chapter

President, Mrs. Henry O. Kendall, 3 Englewood Road, Baltimore, Md.

Secretary, Jane Ewing, 3313 Liberty Heights Avenue, Baltimore, Md.

Massachusetts Chapter

President, Florence L. Kenney, 264 Brookline Ave., Boston, Mass.

Secretary, M. Lella Dwyer, 59 Sawyer Ave., Dorchester, Mass.

Michigan Chapter

President, Norma Graham, 25 E. Palmer Ave., Detroit, Mich.

Secretary, Eleanor Parmalee, 464 Maplehurst Ave., Ferndale, Mich.

Minnesota Chapter

President, Georgia May Schori, Shriners Hospital, Minneapolis, Minn.

Secretary, Lillian Hubmer, 2515 Nicollet Ave., Minneapolis, Minn.

New Jersey Chapter

President, Mary P. Sweeney, St. Barnabas Hospital, Newark, N. J.

Secretary, Laurel Moore, 176 Woodland Ave., Verona, N. J.

New York Chapter

President, Mrs. Rochelle Winstanley, Vet. Hosp., Kingsbridge Rd., New York, N. Y.

Secretary, Margit Aden, 50 E. 10th St., New York, N. Y.

Northern California Chapter

President, M. Caroline Wells, 888—33rd St., San Francisco, Calif.

Secretary, Gertrude S. Randle, U. S. Marine Hospital, San Francisco, Calif.

Ohio Chapter

President, Mrs. Charlotte J. Patterson, 2640 Sherwood Rd., Bexley, Columbus, O.

Secretary, Enid J. Fifield, Randall J. Condon School, Cincinnati, O.

Oregon Chapter

President, Jennie Hunter, 4005 S. E. Stark, Portland, Oregon.

Secretary, Hazel G. Hardy, 101—9th Street, Oregon City, Oregon.

Pennsylvania Physiotherapy Association, Inc.

President, Mr. S. Paul Campbell, 2523 Mansfield Ave., Drexel Hill, Pa.

Secretary, Mrs. Helen Fidler Kenney, 345 S. 18th St., Philadelphia, Pa.

Rhode Island Chapter

President, Mrs. Bessie W. Hooper, 168 Narragansett St., Edgewood, R. I.

Secretary, Emelyn H. Fales, Bradley Memorial Hospital, East Providence, R. I.

Santa Barbara Chapter

President, Helen Oakley, 1421 State St., Santa Barbara, Calif.

Secretary, Mabel Ward, 1421 State St., Santa Barbara, Calif.

Southern California Chapter

President, Margaret Andrews, 3610 W. 17th St., Los Angeles, Calif.

Secretary, Elizabeth A. Hughes, 370 N. Rampart Blvd., Los Angeles, Calif.

Texas Chapter

President, Mary Callaghan, Nix Hospital, San Antonio, Texas.

Secretary, Elsie Kuraner, Station Hospital, Fort Sam Houston, Texas.

Virginia Chapter

President, Alice N. Jones, 318 W. Franklin St., Richmond, Va.

Secretary, Elsa M. Lange, 1536 West Avenue, Richmond, Va.

Washington Chapter

President, Toinette Balkema, 21 Prospect Ave., Seattle, Wash.

Secretary, Evangeline Courtney, Swedish Hospital, Seattle, Wash.

Western Michigan Chapter

President, Louise Holt, County Bldg., Kalamazoo, Mich.

Secretary, Karla Stanek, 138 Fellows St., Kalamazoo, Michigan.

Western New York Chapter

President, Jean C. Bailey, 880 Lafayette Ave., Buffalo, N. Y.

Secretary, Mrs. Mary Jones, 125 Riverside Ave., Buffalo, N. Y.

Wisconsin Chapter

President, Mary Ellen Reedy, 715 S. Jackson Street, Green Bay, Wisc.

Secretary, Inez Christensen, 308 E. Washington Ave., Appleton, Wisc.